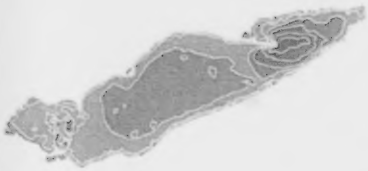

2012 Status of Major Stocks

Lake Erie Management Unit
March 2013

Ontario

The Lake Erie Management Unit of the Ontario Ministry of Natural Resources is responsible for managing the fishery resources of the Ontario waters of Lake Erie as well as the upper Niagara River, the Detroit River, Lake St. Clair, and the St. Clair River.

Ontario has been responsible for managing the fishery resources of these waters since 1898. In 1992, the Lake Erie Management Unit was created to improve Ontario's ability to manage these important resources. The Unit is based in London with field offices in Port Dover and Wheatley.

VISION: The Lake Erie Management Unit will contribute to the environmental, social, and economic well-being of the people of Ontario through the sustainable development of fishery resources within the Lake Erie basin.

MISSION: To ensure the long-term health of the Lake Erie ecosystem and to promote the sustainable harvest and development of its fishery resource through sound science, assessment, regulation, and advocacy.

GOAL: To foster and encourage the understanding of all users and partners on the complexity of managing the fishery resource of Lake Erie, to minimize conflict, and to endorse sound fishery management practices.

Under the Joint Strategic Plan for Management of Great Lakes Fisheries, the fisheries resources of Lake Erie and Lake St Clair are managed cooperatively by Ontario and the four U.S. states – New York, Pennsylvania, Ohio and Michigan.

Cover Photo (top to bottom):

Assessment Biologist, Andy Cook measuring Walleye in the Wheatley lab
Port Dover MNR staff working on Grand River Walleye Tagging Program (left to right: Gord Ives – Vessel Master and Wyatt Hall – Fisheries Technician)
Port Dover MNR staff working on Long Point Bay Deepwater Trawling Program (left to right: Wyatt Hall – Fisheries Technician and Gord Ives – Vessel Master)
Wheatley MNR staff working on Lake St. Clair Trap Netting Program (left to right: Craig McDonald – Vessel Master, Tyler Genereaux - Fisheries Technician, Stan Powell – Operations Coordinator, David Scratch – Fisheries Technician)
Long Point Bay Lighthouse courtesy of Dixie Greenwood

2012 Status of Major Stocks

Lake Erie Management Unit

March 2013

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TABLE OF CONTENTS

		Page
	FORWARD	1
1.	**STATUS OF MAJOR SPECIES**	2
2.	**COMMERCIAL FISHERY**	
	2.1 Lake Erie Fishery	3
	2.2 Inner Long Point Bay Fishery	16
3.	**LAKE ERIE SPORT FISHERY DIARY PROGRAM**	17
4.	**INDEX FISHING PROJECTS**	
	4.1 Partnership Index Fishing: Gill Netting	27
	4.2 Index Trawling: Western Lake Erie	59
	4.3 Long Point Bay Index Trawl Surveys	68
	4.4 Long Point Bay Nearshore Fish Community Survey	80
5.	**FISHERIES MANAGEMENT PROJECTS**	
	5.1 Western Basin Smallmouth Bass Spawning Study	89
	5.2 Lake Erie Asian Carp Surveillance Program	94
6.	**LAKE ST. CLAIR PROJECTS**	
	6.1 St. Clair System Sport Fishery Diary Program	95
	6.2 Lake St. Clair Fall Trap Net Index	99
	6.3 Lake St. Clair Nearshore Index Fishing Program	106
APPENDIX A:	Lake Erie Management Unit Staff 2012	109

FORWARD

The mission of the Lake Erie Management Unit (LEMU) is to provide leadership and direction on sustainable resource management for Lake Erie, by maintaining and, where possible enhancing the social, economic, cultural and environmental benefits of the lake's rich aquatic resources. The LEMU works to achieve this through its annual fisheries assessment, Port Officer program and management activities on the Canadian waters of Lake Erie, Lake St. Clair and connecting waters. Presently the LEMU maintains facilities in Wheatley, Port Dover, and London. The Unit also provides a coordination function for commercial fish management across the province of Ontario.

The Province of Ontario and four U.S. States share the responsibility for managing Lake Erie's fishery resource. Since fish populations do not recognize borders, international cooperation is essential to the sustainable management of Lake Erie's fisheries. This cooperation is achieved via the Lake Erie Committee (LEC), which is comprised of representatives from state and provincial fisheries management agencies under the auspices of the Great Lakes Fishery Commission (GLFC). On a rotational basis, Ontario's Lake Erie Manager either chairs or vice-chairs this committee. Lake Erie Management Unit staff make key contributions to all of the LEC Task Groups, which jointly pursue scientific objectives, evaluate international fisheries management strategies, and sets harvest levels for the lake.

The Lake Erie Management Unit consults regularly with resource management partners, namely Ontario sport and commercial fish interests on Lake Erie and Lake St. Clair. The principal venue for this consultation process is the Fisheries Management Zone 19 Council. Within this group, representatives from the sport and commercial bait and food fisheries discuss emergent and long-term fisheries issues, with the Lake Erie Manager acting as chair and facilitator. In addition, the Lake Erie Management Unit participates in the Lake Erie Percid Management Advisory Group (LEPMAG), which was established to help guide future Walleye and Yellow Perch management in Lake Erie. This group consists of LEC members, agency staff, and stakeholders from all jurisdictions bordering Lake Erie, and is facilitated by staff from the Quantitative Fisheries Centre of Michigan State University.

The purpose of the LEMU Status of Stocks report is to summarize and present Ontario's assessment and fishery data for Lake Erie and Lake St. Clair. This data is incorporated with similar information from the U.S. jurisdictions and analyses are performed by various task groups to determine population status, and recommend harvest levels that are consistent with LEC objectives.

The LEMU Team is pleased to present this report to our stakeholders and colleagues, and welcome any questions or comments you may have on its content.

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1. STATUS OF MAJOR SPECIES

The following is an overview of the status of major species in Ontario waters of Lake Erie for 2012. International lakewide perspectives are available in the following detailed scientific reports of the Lake Erie Committee (LEC) of the Great Lakes Fishery Commission:

Walleye Task Group Report
Yellow Perch Task Group Report
Forage Task Group Report
Cold Water Task Group Report
Habitat Task Group Report

Walleye

Lakewide commercial Walleye harvest (5.0 million pounds) in 2012 exceeded the mean harvest from 2000 to present (4.7 million pounds) but remained below the mean harvest from the inception of individual transferable quotas (ITQs) (1984) to present (6.5 million pounds). In 2012, the commercial Walleye fishery was composed mainly of the 2003 (age 9), 2010 (age 2), 2009 (age 3) and 2007 (age 5) year classes. Lakewide fall surveys also indicated a strong presence of age 2 and age 9, and a moderate presence of age 3 and age 5 Walleye. These four year classes will be the major contributors to the fishery and to spawner biomass in 2013. Interagency trawling to assess year class strength indicated a smaller than average 2011 year class which will recruit to the fishery in 2013, and a similarly poor 2012 year class which will recruit to the fishery in 2014. Overall, the abundance of Walleye in the west and central basins is at a moderate level.

In 2012, the Lake Erie Management Unit (LEMU), through the LEC, continued to implement the Walleye Management Plan (WMP) to determine total allowable catch (TAC) for Lake Erie Walleye. In 2010, the LEC formed the Lake Erie Percid Management Advisory Group (LEPMAG), consisting of Lake Erie managers, scientists and stakeholders, with facilitation from Michigan State University's Quantitative Fisheries Center. The purpose of this group is to advise on objectives and management options for Lake Erie percids. In 2011, LEPMAG outlined objectives for the Lake Erie Walleye population, suggested modifications to the Walleye assessment model and outlined a range of possible management options. In 2012, this group put forth an updated Walleye assessment model and evaluated potential harvest strategies. Contributions from LEPMAG will inform the harvest strategy for Walleye in 2013 and beyond.

The Walleye population in eastern Lake Erie consists of mixed stocks including those originating from east basin shoals, the Grand River, United States tributaries, and immigrants from the western portion of the lake. Representation of older Walleye is typically greater in eastern Lake Erie compared to other regions of the lake. The greater average age of Walleye in the eastern basin is due in part to the contribution of older migratory individuals originating from the western basin. In 2012, the strong 2003 year class at age 9 represented 39% of the commercial harvest in Ontario statistical districts 4 and 5 combined (Figure 2.1.1). Age 9 Walleye also comprised a large fraction of the Walleye caught in the east basin partnership gill net survey in 2012. Age 2 fish were the largest fraction of Walleye caught in eastern basin partnership surveys, indicating a strong 2010 year class in the eastern basin which will contribute to the fishery in 2013.

Yellow Perch

Lakewide Yellow Perch harvest in 2012 (6.9 million pounds) exceeded the mean harvest in 2000 to present (5.5 million pounds) and the long term mean harvest from when ITQs were introduced in 1984 (6.0 million pounds). In 2012, the lakewide commercial Yellow Perch fishery was mainly comprised of age 4 fish (2008 year class) and age 5 fish (2007 year class). In addition, the eastern basin fishery harvested a high proportion of age 2 Yellow Perch, indicating a strong 2010 year class in the eastern basin. The strong 2003 year class continued to contribute to the Yellow Perch fishery; it was the fourth most dominant age group in the lakewide commercial fishery. Fisheries in 2013 will

continue to benefit from the 2008 and 2007 year classes in the west and central basins, and from the 2008 and 2010 year classes in the east basin.

Combined interagency assessment across multiple decades indicate that age 2 and older Yellow Perch remain below average in the west and west-central basins and above average in the east-central and east basins. In Ontario waters, partnership survey indices in 2012 for age 2 and older Yellow Perch were moderate compared to recent years in the west, west-central and east-central basins and good in the eastern basin. The 2011 year class, recruiting to the fishery in 2013, was poor in the west and west central basins, but may be stronger in the east central and eastern basins. The 2012 year class, recruiting to the fishery in 2014, was poor in the western basin trawl survey and poor to moderate in the eastern basin Long Point Bay trawl assessment.

In 2012, LEPMAG began consultations on Yellow Perch fishery objectives and management options to be utilized in a management plan for Yellow Perch fisheries. In 2013, LEPMAG will begin work on updating Yellow Perch assessment models and harvest strategies.

Lake Whitefish

While harvest trends help to describe the status of Lake Whitefish stocks, fishery data is of marginal assessment value since a significant portion of the harvest is incidental and comes from Walleye or White Bass effort. This targeted effort varies considerably between years. General measures of year class strength come from fishery harvest and the partnership gill net survey. In 2012, only 14 Lake Whitefish were caught in the partnership gill net survey. These fish were mainly from the strong 2003 (age 9) year class and 2005 (age 7) year class; however there was one age 3 fish.

Lake Whitefish harvest in 2012 (215 thousand pounds) was well below the mean harvest for recent (2000-2012; 708 thousand pounds) and long term (1984-2012; 535 thousand pounds) periods. Lake Whitefish recruit to the commercial harvest gear around age 4. In 2012, the majority of the commercial Lake Whitefish harvest came from the 2003 and 2005 year classes. Recent Lake Whitefish recruitment appears to be poor; no age 4 or age 5 fish were harvested in the commercial fishery. The 2003 and 2005 year classes will continue to contribute to fisheries in 2013. Older Lake Whitefish were observed in the 2012 Ontario fisheries (up to age 23) and population assessment (up to age 22), reflecting the survival of older year classes.

2. COMMERCIAL FISHERY

2.1 Lake Erie Fishery

In 2012, total commercial landings from Ontario waters of Lake Erie were 25.8 million pounds, an increase of over 4 million pounds (19%) from 2011 (Table 2.1.1). The value of the total commercial landings in 2012 was $31.8 million, an increase of $4.0 million (14%) from 2011 (Table 2.1.1). The increase in harvest and value of landings is due in part to the increase in fishing effort for Rainbow Smelt as well as the increase of Walleye quota in 2012. Harvest and landed value in 2012 are presented for each species by statistical district (Ontario Erie or OE, Figure 2.1.1) in Table 2.1.2.

Rainbow Smelt

The total landings of Rainbow Smelt increased 26% to 7.5 million pounds in 2012 (Tables 2.1.2 and 2.1.3, Figure 2.1.4). The harvest was taken from OE-4 (68%), OE-2 (18%) and OE-5 (15%). Summer harvest in OE- 4 was primarily age 2 (43%), age 1 (23%) and age 3 (22%) fish. Age 1 fish comprised over 75% of OE- 5 harvests throughout the year, while a broad range of ages (2 through 5) made up the harvest in OE- 2 (Table 2.1.4). The commercial fishery harvested 48% of the quota allocated for 2012. Of the 77 Smelt licences, 45 were not fished in 2012 while only 3 licences

attained more than 90% of individual quota. The landed value of Rainbow Smelt was $1.7 million, up 26% from 2011 (Tables 2.1.2 and 2.1.3).

Yellow Perch

In 2012 Yellow Perch landings increased 8% to 6.9 million pounds in 2012 (Tables 2.1.2 and 2.1.3, Figure 2.1.4). The commercial fishery harvested 99% of allocated quota in 2012. Spring fisheries were characterized by harvest from a broad range of ages with Ages 4 and 5, making a significant contribution to the harvest in OE-1 to OE–4 (46 to 83% combined). In the summer and fall harvest in OE-1, OE-2 and OE-3 ages 4 and 5 were the major contributors (>70% combined). Age 2 fish contributed over 66% and 86% respectively to OE-4 and OE- 5's fall harvests. The landed value of Yellow Perch increased 15%, from 2011 to $16.0 million in 2012 (Tables 2.1.2 and 2.1.3).

Walleye

In 2012 Walleye landings increased 14% to 5.0 million pounds (Tables 2.1.2 and 2.1.3, Figure 2.1.4). Ninety-seven percent of the 2012 quota was harvested. Lakewide harvest by Walleye size category was: Jumbo (55%), and Number 1 (43%) (see Table 2.1.6 for description of size categories). In the Number 1 category the 2010 year class, age 2, was a significant portion of the harvest in OE-1 to OE-5 (27 to 68%). Ages 2 through 5 fish of the Number 1 category became a significant part of the summer and fall harvest in OE-1 and OE-2 (78 to 93% combined). The 2003 year class at age 9 was the major contributor to the jumbo harvest throughout the year (Table 2.1.6). The landed value of Walleye increased 14% from 2011 to $10.3 million in 2012 (Tables 2.1.2 and 2.1.3).

White Bass

The total landings of White Bass in 2012 increased 1.7 million pounds (97%) to 3.6 million pounds in 2012 (Tables 2.1.2 and 2.1.3, Figure 2.1.4). The majority of harvest occurred in statistical districts OE-2 (48%) and OE-1 (43%). Ages 2 and 4 fish dominated spring harvest in OE-1 (56%) and OE-2 (72%). Age 2 fish were the significant contributors to OE- 1 and OE-2 summer and fall harvests (46 to 93%) (Table 2.1.7). White Bass have not been regulated by quota since 1993. The landed value of White Bass increased 49% to $2.1 million in 2012 (Tables 2.1.2 and 2.1.3).

White Perch

In 2012 the total landings of White Perch increased 7% to 2.4 million pounds in 2012 (Tables 2.1.2 and 2.1.3, Figure 2.1.4). The majority of harvest occurred in statistical districts OE-2 52% and OE-3 34%. In OE-1 and OE-2 spring harvest was from a broad range of ages (2 to 7 year olds) with age 4 the major contributor in OE-1 (48%) and ages 4 and 5 in OE-2 (68% combined) (Table 2.1.8). White Perch are not regulated by quota. The total landed value of White Perch increased 9% to $1.3 million in 2012 (Tables 2.1.2 and 2.1.3).

Lake Whitefish

In 2012 the total landings of Lake Whitefish decreased 315 thousand pounds (59%) to 215 thousand pounds in 2012 (Tables 2.1.2 and 2.1.3, Figure 2.1.4). The commercial fishery harvested 22% of the quota allocated for 2012. Seventy-seven percent of the total harvest came from OE-1, while twenty-one percent was harvested from OE-2. The harvest was dominated by age 9 fish (45 to 63%) and age 7 fish (21 to 35%) throughout the year (Table 2.1.9). The landed value of Lake Whitefish decreased $443,000 (62%) to $274,000 in 2012 (Tables 2.1.2 and 2.1.3).

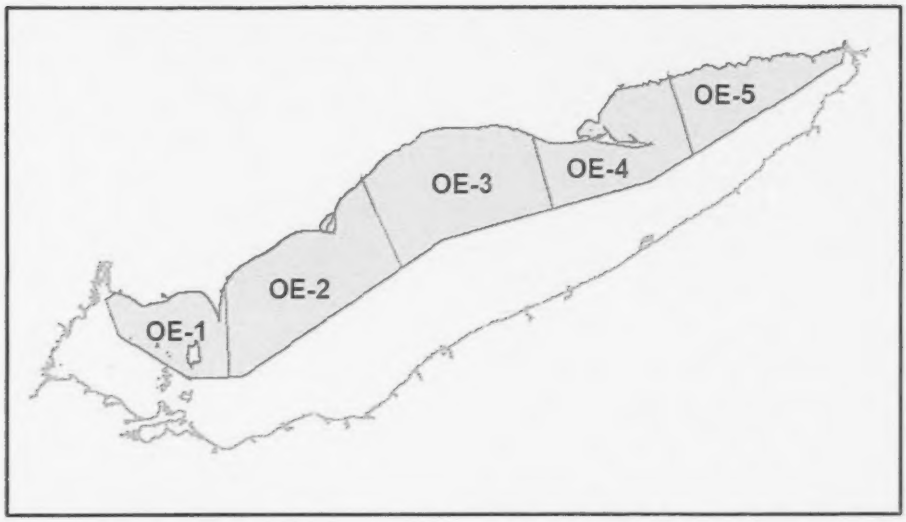

Figure 2.1.1 Spatial location of statistical districts in the Canadian waters of Lake Erie.

Table 2.1.1 Total annual commercial fishery landings (pounds) and value ($ CDN) from the Canadian waters of Lake Erie, 1960-2012.

Year	Total Pounds	Total Value	Year	Total Pounds	Total Value
1960	28,181,000	2,033,000	1987	47,542,123	36,458,014
1961	36,350,000	2,516,000	1988	45,333,210	42,069,940
1962	43,296,419	2,296,635	1989	42,225,415	36,642,716
1963	34,069,000	2,523,635	1990	42,533,681	31,191,417
1964	25,391,428	2,377,284	1991	42,447,098	28,198,998
1965	35,096,120	3,319,307	1992	32,814,073	28,888,799
1966	41,435,283	3,104,813	1993	35,524,282	27,545,957
1967	37,775,009	3,339,460	1994	28,306,102	29,957,675
1968	39,415,250	2,973,814	1995	27,788,500	32,158,827
1969	48,025,996	4,244,149	1996	27,566,700	31,406,644
1970	31,755,446	3,770,281	1997	32,912,134	33,640,390
1971	29,075,559	4,254,692	1998	34,731,109	38,144,985
1972	29,978,000	5,324,000	1999	30,540,383	34,114,272
1973	39,829,000	7,038,000	2000	22,871,377	30,872,107
1974	38,686,000	5,634,000	2001	22,096,515	26,612,420
1975	30,548,620	6,009,093	2002	25,237,063	30,349,232
1976	25,729,080	6,000,970	2003	21,702,507	25,414,340
1977	35,853,556	7,736,701	2004	27,106,068	23,688,955
1978	40,159,610	9,883,626	2005	25,065,670	30,237,098
1979	40,839,668	17,555,598	2006	22,847,529	30,750,957
1980	42,849,000	14,207,000	2007	28,224,615	27,584,280
1981	44,711,277	20,279,830	2008	25,824,134	21,698,647
1982	59,500,000	26,183,000	2009	23,969,575	21,373,889
1983	45,682,046	17,613,206	2010	19,789,394	25,617,325
1984	36,305,219	26,349,853	2011	21,648,261	27,774,266
1985	43,367,069	20,255,403	2012	25,816,359	31,800,755
1986	39,112,618	34,961,819			

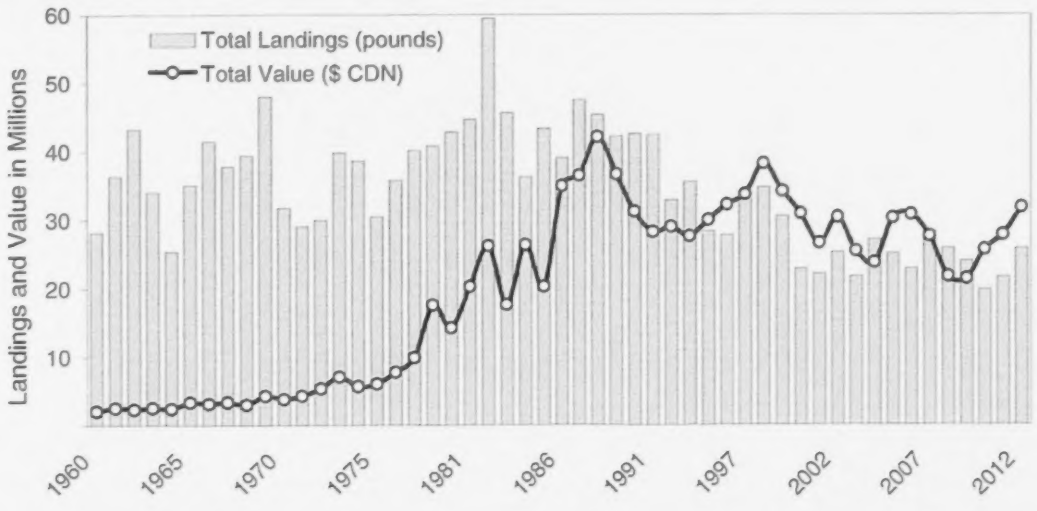

Figure 2.1.2 Commercial fishery landings (pounds) and value ($ CDN) from the Canadian waters of Lake Erie, 1960-2012.

Table 2.1.2 Total annual commercial fishery landings (landed weight in pounds) and value dollars by fish species and statistical district for the Canadian waters of Lake Erie, 2012.

Species	Landings by Statistical District					Total Landing	Total Value
	OE-1	OE-2	OE-3	OE-4[a]	OE-5		
Brown Bullhead	125					125	$34
Burbot		8		64	100	172	$0
Carp	1,449	127	29			1,605	$8,050
Catfish	23,565	3,969	1,804	22	226	29,586	$271
Freshwater Drum	20,334	48,807	17,853	200	41	87,235	$7,411
Gizzard Shad	17,565	7,176				24,741	$928
Lake Whitefish	165,259	44,465	1,114	2,864	1,349	215,051	$274,423
Rainbow Smelt		1,315,702	12,068	5,034,786	1,089,399	7,451,955	$1,716,060
Rock Bass	103	1				104	$22
Suckers	27,751	15,545	165		88	43,549	$10,838
Walleye	2,871,892	1,087,442	947,563	32,289	110,734	5,049,920	$10,290,225
White Bass	1,556,447	1,723,455	306,815	3,515	3,575	3,593,807	$2,129,398
White Perch	260,916	1,243,604	892,053	10,232	10,185	2,416,990	$1,331,586
Yellow Perch	752,872	1,877,615	3,688,197	130,328	452,436	6,901,448	$16,031,453
Mixed[b]	62	6	3			71	$57
Total Landing (lbs.)	5,698,340	7,367,922	5,867,664	5,214,300	1,668,133	25,816,359	
Total Value ($)	$8,871,277	$8,359,254	$11,454,775	$1,536,154	$1,579,295		$31,800,755

[a] Excludes Inner Long Point Bay.

[b] A variety of incidentally caught species of little or no value.

Preliminary February 4, 2013

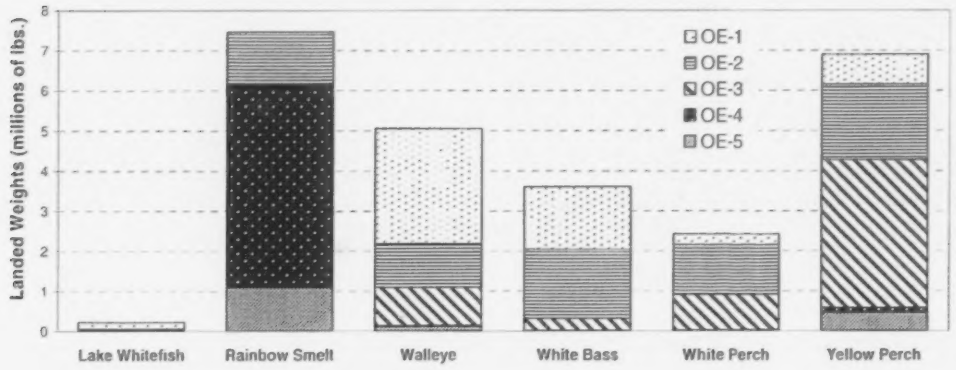

Figure 2.1.3 Total annual commercial fishery landed weights (millions of lbs.) for principle species by statistical district, Lake Erie 2012.

Table 2.1.3 Change in weight of the annual commercial fishery landed weight (pounds) from 2011 to 2012 by the fish species and statistical district for the Canadian waters of Lake Erie.

Species	Landings by Statistical District					Total Landing	Total Value
	OE-1	OE-2	OE-3	OE-4a	OE-5		
Brown Bullhead	125	0	0	0	0	125	34
Burbot	0	-37	-21	-166	-1,817	-2,041	-5
Carp	-747	-421	-129	0	0	-1,297	7,653
Catfish	11,924	-492	121	22	58	11,633	-4,962
Freshwater Drum	-25,481	-36,548	-126,511	200	-95	-188,435	-15,697
Gizzard Shad	12,338	817	-2,757	0	0	10,398	528
Lake Whitefish	-173,894	-35,110	-3,807	-1,387	-100,764	-314,962	-443,149
Rainbow Smelt	0	-1,189,501	-784,071	2,698,906	816,911	1,542,245	356,940
Rock Bass	23	1	-7	-5	0	12	-3
Suckers	2,183	8,472	-231	0	88	10,512	3,075
Walleye	386,802	144,943	105,960	19,134	-24,885	631,954	1,250,639
White Bass	866,483	1,017,905	-113,959	-468	472	1,770,433	696,741
White Perch	-143,632	108,600	200,560	-2,871	3,884	166,541	109,977
Yellow Perch	-117,930	212,357	361,253	368	74,927	530,975	2,064,692
Mixed[b]	-3	5	3	0	0	5	57
Total Landing (lbs.)	818,191	230,991	-363,596	2,713,733	768,779	4,168,098	
Total Value ($)	655,507	1,061,772	1,408,419	653,894	246,896		4,026,489

[a] Excludes Inner Long Point Bay.
[b] A variety of incidentally caught species of little or no value, plus species with total landings less than 50 pounds.

Figure 2.1.4 Change in weight of the annual commercial fishery landings (1000's of lbs.) from 2011 to 2012 for principle species by statistical district, Lake Erie.

Table 2.1.4 Rainbow Smelt year class composition, average total length (mm) and weight (g) from Lake Erie commercial catch samples taken from trawl nets by statistical district and season, 2012. n is sample size, sexes combined.

Stat. Dist.	Season*	Year Class and Age										All Ages	
		2012	2011	2010	2009	2008	2007	2006	2005	2004	2003	Average	n
		0	1	2	3	4	5	6	7	8	9		
Age Group Composition (%) **													
OE-2	Spring		1	28	40	23	7	1				3.1	141
	Summer		5	30	23	25	13	4				3.2	79
OE-4	Spring		13	59	23	4	1					2.2	248
	Summer		23	43	22	10	2	0				2.3	515
	Fall	6	39	25	19	9	2					1.9	100
OE-5	Summer		74	23	3							1.3	39
Mean Total Length (mm)													
OE-2	Spring		109	125	140	149	154	144				139	141
	Summer		109	125	144	146	159	149				139	79
OE-4	Spring		90	118	156	151	163					125	248
	Summer		119	137	160	174	191	159				143	515
	Fall	77	127	155	171	176	181					145	100
OE-5	Summer		119	138	164							125	39
Mean Round Weight (g)													
OE-2	Spring		7	13	18	22	25	18				18	141
	Summer		7	12	18	18	26	21				17	79
OE-4	Spring		4	9	22	22	24					12	248
	Summer		9	16	24	33	46	24				19	515
	Fall	2	11	25	32	34	38					21	100
OE-5	Summer		9	14	26							11	39

* Season: Winter = January - March Spring = April - June Summer = July - September Fall = October - December

** A hyphen (-) indicates no fish of that age, a zero (0) indicates less than 0.5% fish of that age.

Table 2.1.5 Yellow Perch year class composition, average total length (mm) and weight (g) from Lake Erie commercial catch samples from small mesh (<76mm) gill nets by statistical district and season, 2012. n is sample size, sexes combined.

Stat. Dist.	Season*	Year Class and Age										All Ages	
		2011	2010	2009	2008	2007	2006	2005	2004	2003	2002	Average	n
		1	2	3	4	5	6	7	8	9	10+		
Age Group Composition (%) **													
OE-1	Spring			4	54	29	9	1	1	2		4.6	359
	Summer		5	10	58	24	3	-		0		4.1	320
	Fall		10	15	42	25	5	1		1		4.1	320
OE-2	Spring		0	2	37	32	18	2	1	7	0	5.1	638
	Summer		1	6	47	31	12	1	0	1		4.6	551
	Fall		6	4	45	32	10	2	1	1		4.5	397
OE-3	Spring		-	1	19	27	34	7	4	7	1	5.8	1481
	Summer		1	2	40	36	17	3	1	1		4.8	861
	Fall		4	4	50	31	10	0	0	1		4.4	474
OE-4	Spring			18	50	20	13	-		-		4.3	40
	Summer		3	-	33	33	20	10		3		5.1	40
	Fall		66	3	26		3	3				2.8	38
OE-5	Spring		7	8	52	18	11	3	0	0		4.3	237
	Summer		31	3	41	16	7	2	1	0		3.8	508
	Fall		86	1	10	3				-		2.3	77
Mean Total Length (mm)													
OE-1	Spring		-	199	214	221	227	221	225	252		217	359
	Summer		202	214	221	223	220	-		243		220	320
	Fall		216	218	223	225	249	225		248		224	320
OE-2	Spring		180	211	216	222	229	233	249	259	259	224	638
	Summer		212	218	217	220	218	215	231	235	-	219	551
	Fall		220	226	232	239	246	273	252	282		236	397
OE-3	Spring		-	216	214	220	223	237	235	247	249	224	1481
	Summer		208	212	213	217	217	221	226	231		216	861
	Fall		216	227	229	232	237	231	315	243		230	474
OE-4	Spring		-	259	248	235	246	-		-		247	40
	Summer		234	-	256	264	258	259		260		259	40
	Fall		225	222	233		240	260				228	38
OE-5	Spring		200	224	234	234	229	244	295	302		231	237
	Summer		214	227	246	255	239	253	304	249		237	508
	Fall		219	215	230	240						221	77
Mean Round Weight (g)													
OE-1	Spring		-	107	133	148	166	144	141	259		143	359
	Summer		111	131	141	148	143	-		164		140	320
	Fall		122	126	139	149	212	147		197		142	320
OE-2	Spring		82	133	140	152	167	178	191	250	228	157	638
	Summer		129	145	143	148	147	143	185	179		146	551
	Fall		135	149	168	194	215	313	220	324		183	397
OE-3	Spring			137	134	148	150	186	169	212	220	155	1481
	Summer		121	131	133	143	144	158	162	192		140	861
	Fall		132	151	159	169	188	172	467	197		164	474
OE-4	Spring		-	246	209	155	205					204	40
	Summer		170		248	274	259	251		220		256	40
	Fall		156	161	174		210	248				165	38
OE-5	Spring		108	145	165	171	149	181	401	364		161	237
	Summer		132	159	214	250	195	230	434	200		193	508
	Fall		138	148	175	174						143	77

* Season: Winter = January-March Spring = April-June Summer = July-September Fall = October-December

** A hyphen (-) indicates no fish of that age, a zero (0) indicates less than 0.5% fish of that age.

Table 2.1.6 Walleye year class composition, average total length (mm) and weight (g) from Lake Erie commercial catch samples from large mesh (≥76mm) gill nets by statistical district and season, 2012. n is sample size, sexes combined.

Stat. Dist.	Season*	Category**	Year Class and Age										All Ages	
			2011	2010	2009	2008	2007	2006	2005	2004	2003	2002	Average	n
			1	2	3	4	5	6	7	8	9	10+		
			Age Group Composition (%)***											
OE-1	Winter	Number 1		47	47		5						2.6	19
	Spring	Number 1		7	38	13	22	0	2	1	16	1	4.7	415
		Jumbo			1	5	20		4	1	58	10	7.9	98
	Summer	Number 1	5	58	11	11	13				3		2.8	38
	Fall	Number 1	2	50	23	8	10		1		7	1	3.2	431
		Jumbo			8	9	22		4	2	51	4	7.1	85
		Number 2	100										1.0	8
OE-2	Spring	Number 1		9	34	7	17	1	2	2	24	4	5.2	227
		Jumbo		1	4	11	16	1	3	2	52	10	7.5	137
	Summer	Number 1	3	27	22	11	18	2	2		13	1	4.2	92
		Jumbo				17	33		6		44		6.7	18
	Fall	Number 1	2	48	26	9	9				6		3.2	109
		Jumbo			5	5	30		5	5	40	10	7.2	20
OE-3	Spring	Number 1			5	13	28		8		44	3	6.8	39
		Jumbo		2	2	6	13	1	3	2	61	10	7.9	173
	Summer	Number 1				5	15	5	5		65	5	8.0	20
		Jumbo		2	6	10	22	4	5	1	40	10	7.0	139
	Fall	Number 1	3	68	26	3							2.3	38
		Jumbo			55	10	25				10		4.2	20
OE-4	Summer	Jumbo				13	8	10	18	5	30	18	7.6	40
OE-5	Summer	Jumbo				12	7	13	5	2	43	18	7.8	60
	Fall	Number 1		45	8	35	5	3			5		3.4	40
			Mean Total Length (mm)											
OE-1	Winter	Number 1		407	465		568						443	19
	Spring	Number 1		395	472	507	530	560	530	533	546	545	498	415
		Jumbo			521	553	566		601	560	637	658	617	98
	Summer	Number 1	285	400	465	482	490				650		428	38
	Fall	Number 1	389	460	502	510	537		522		541	585	486	431
		Jumbo			541	579	582		595	594	604	695	594	85
		Number 2	370										370	8
OE-2	Spring	Number 1		402	475	525	564	604	608	605	605	651	531	227
		Jumbo		407	496	554	570	645	614	614	651	676	618	137
	Summer	Number 1	343	443	490	520	519	530	557		544	503	491	92
		Jumbo				561	526		597		574		557	18
	Fall	Number 1	396	467	510	546	526				543		494	109
		Jumbo			540	573	565		597	540	629	678	601	20

Continued ...

Table 2.1.6 continued...

Stat. Dist.	Season*	Category**	Year Class and Age										All Ages	
			2010	2009	2008	2007	2006	2005	2004	2003	2002	2001	Average	n
			1	2	3	4	5	6	7	8	9	10+		
Mean Total Length (mm) continued...														
OE-3	Spring	Number 1			472	534	559		611		611	673	581	39
		Jumbo		372	484	538	569	637	616	617	633	672	614	173
	Summer	Number 1				536	591	609	525		623	534	604	20
		Jumbo		469	520	562	577	602	601	628	630	643	601	139
	Fall	Number 1	392	478	531	588							492	38
		Jumbo			547	633	632				680		590	20
OE-4	Summer	Jumbo				580	571	624	630	653	646	642	627	40
OE-5	Summer	Jumbo				561	581	622	608	690	636	675	628	60
	Fall	Number 1		463	515	527	519	534			549		498	40
Mean Round Weight (g)														
OE-1	Winter	Number 1		772	1108		1508						970	19
	Spring	Number 1		659	1085	1226	1399	1648	1357	1462	1562	1426	1230	415
		Jumbo			1681	1688	1743		2476	1616	2590	2828	2372	98
	Summer	Number 1	217	607	954	1036	1086				2691		786	38
	Fall	Number 1	597	1014	1396	1431	1702		1516		1714	2364	1252	431
		Jumbo			1780	2232	2187		2345	2401	2504	3765	2385	85
		Number 2	498										498	8
OE-2	Spring	Number 1		710	1186	1478	1829	2379	2294	2148	2286	3075	1656	227
		Jumbo		700	1377	1799	1856	3420	2472	2711	2929	3207	2558	137
	Summer	Number 1	403	861	1155	1390	1397	1386	1850		1737	1243	1218	92
		Jumbo				1723	1398		1845		1943		1719	18
	Fall	Number 1	613	1112	1462	1881	1669				2028		1373	109
		Jumbo			1905	2036	2015		2384	1744	2724	3322	2430	20
OE-3	Spring	Number 1			1224	1592	1660		2204		2387	3121	2025	39
		Jumbo		509	1241	1600	1844	2692	2441	2434	2616	3234	2446	173
	Summer	Number 1				1425	2087	2280	1500		2524	1407	2284	20
		Jumbo		1127	1508	1846	2056	2404	2161	2117	2626	2938	2322	139
	Fall	Number 1	633	1181	1671	2220							1323	38
		Jumbo			1797	2813	2644				3215		2252	20
OE-4	Summer	Jumbo				2125	1875	2763	2856	3156	2837	2818	2684	40
OE-5	Summer	Jumbo				1796	2145	2566	2260	3662	2731	3201	2639	60
	Fall	Number 1	-	1053	1399	1560	1567	1791	-	-	1654		1331	40

* Season: Winter = January - March Spring = April - June Summer = July - September Fall = October - December

** Category: Number 1 (Category 1) = generally between 381 - 533 mm in total length
Jumbo (Category 2) = generally greater than 533 mm in total length
Number 2 (Category 3) = generally less than 381 mm in total length

*** A hyphen (-) indicates no fish of that age, a zero (0) indicates less than 0.5% fish of that age.

Table 2.1.7 White Bass year class composition and average total length (mm) from Lake Erie commercial catch samples from large mesh (≥76mm) gill nets for marketable fish by statistical district and season, 2012. n is sample size, sexes combined.

Stat. Dist.	Season*	Year Class and Age										All Ages	
		2011	2010	2009	2008	2007	2006	2005	2004	2003	2002	Average	n
		1	2	3	4	5	6	7	8	9	10+		
						Age Group Composition (%) **							
OE-1	Spring		29	3	27	13	13	16				4.3	79
	Summer		46	32	11	4	5	3				3.0	79
	Fall		83	5	8	5						2.4	40
OE-2	Spring		59	6	13	4	5	13				3.3	112
	Summer	1	88	5	3	2	2					2.2	120
	Fall		93	3		5						2.2	40
OE-3	Spring				23	15	15	40	8			6.0	40
	Summer		3		3	8	11	59	8	3	5	6.8	37
						Mean Total Length (mm)							
OE-1	Spring		273	327	339	348	354	365				327	79
	Summer		306	283	333	332	332	367				306	79
	Fall		334	349	366	384						340	40
OE-2	Spring		275	316	327	371	371	373				305	112
	Summer	268	304	327	356	351	368					308	120
	Fall		312	296		364						315	40
OE-3	Spring				364	376	382	384	393			378	40
	Summer		271		361	374	388	388	387	419	397	384	37

* Season: Winter = January - March Spring = April - June Summer = July - September Fall = October - December

** A hyphen (-) indicates no fish of that age, a zero (0) indicates less than 0.5% fish of that age.

Table 2.1.8a White Perch year class composition and average total length (mm) from Lake Erie commercial catch samples from large mesh (≥76mm) gill nets for marketable fish by statistical district and season, 2012. n is sample size, sexes combined.

Stat. Dist.	Season*	Year Class and Age										All Ages	
		2011	2010	2009	2008	2007	2006	2005	2004	2003	2002	Average	n
		1	2	3	4	5	6	7	8	9	10+		
						Age Group Composition (%)**							
OE-1	Summer		1	9	22	37	9	17	3	2	-	5.2	117
OE-2	Spring			3	26	51	10	5	3		3	5.1	39
	Summer		5	8	8	33	18	30				5.4	40
	Fall		26	21	31	21	3					3.5	39
						Mean Total Length (mm)							
OE-1	Summer		209	229	243	262	281	288	306	297		263	117
OE-2	Spring			251	243	253	259	268	299		275	253	39
	Summer		198	219	243	262	284	282				264	40
	Fall		224	239	241	255	300					241	39

* Season: Winter = January - March Spring = April - June Summer = July - September Fall = October - December
** A hyphen (-) indicates no fish of that age, a zero (0) indicates less than 0.5% fish of that age.

Table 2.1.8b White Perch year class composition and average total length (mm) from Lake Erie commercial catch samples from small mesh (<76mm) gill nets for marketable fish by statistical district and season, 2012. n is sample size, sexes combined.

Stat. Dist.	Season*	Year Class and Age										All Ages	
		2011	2010	2009	2008	2007	2006	2005	2004	2003	2002	Average	n
		1	2	3	4	5	6	7	8	9	10+		
						Age Group Composition (%)**							
OE-1	Spring		3	13	48	38						4.2	40
OE-2	Spring			20	35	33	3	10				4.5	40
OE-3	Spring		13	51	25	11						3.4	80
						Mean Total Length (mm)							
OE-1	Spring		215	224	237	246						238	40
OE-2	Spring			207	228	260	296	277				241	40
OE-3	Spring		187	210	226	239						214	80

* Season: Winter = January - March Spring = April - June Summer = July - September Fall = October - December
** A hyphen (-) indicates no fish of that age, a zero (0) indicates less than 0.5% fish of that age.

Table 2.1.9 Lake Whitefish year class composition, average total length (mm) and weight (g) from Lake Erie commercial catch samples from large mesh (≥76mm) gill nets by statistical district and season, 2012. n is sample size, sexes combined.

Stat. Dist.	Season*	Year Class and Age										All Ages	
		2011	2010	2009	2008	2007	2006	2005	2004	2003	2002	Average	n
		1	2	3	4	5	6	7	8	9	10+		
Age Group Composition (%)**													
OE-1	Fall						3	21	2	63	11	8.6	201
OE-2	Spring							35		45	20	8.5	20
Mean Total Length (mm)													
OE-1	Fall						545	560	565	577	609	576	201
OE-2	Spring							554		585	570	572	20
Mean Round Weight (g)													
OE-1	Fall						1608	1783	1898	1969	2482	1972	201
OE-2	Spring							1882		2338	2038	2118	20

* Season: Spring = April - June Summer = July - September Fall = October - December

** A hyphen (-) indicates no fish of that age, a zero (0) indicates less than 0.5% fish of that age.

2.2 Inner Long Point Bay Fishery

The hoop and seine net fishery of Inner Long Point Bay typically contributes less than one percent (0.35%) by weight of the total annual commercial harvest landed in Ontario waters of Lake Erie. In 2012, total commercial landings were 91,161 pounds (Table 2.2.1) representing a decline of 22% from 2011. Live fish accounted for 79% of this harvest. The value of the total commercial landings in 2012 was $91,689, a decrease of 29% from 2011, and 0.45% of the total value of the Commercial fishery in Ontario waters of Lake Erie (Table 2.2.1).

Yellow Perch

In 2012, the total landing of Yellow Perch was 8,411 pounds a decrease of 54% from 2011. The Inner Bay commercial fishery harvested 31% of their allocated quota in 2012. The majority of Yellow Perch (94%) were caught in the spring (March and April combined). The landed value of Yellow Perch in 2012 was $19,632, a decrease of 48% from 2011.

Northern Pike

In 2012, the total landing of Northern Pike was 11,140 pounds, a decrease of 21% from 2011. The Inner Bay commercial fishery harvested 41% of their allocated quota in 2012. The majority of Northern Pike (88%) were caught in the spring (March and April combined). The landed value of Northern Pike in 2012 was $5,339, a decrease of 17% from 2011.

Table 2.2.1 Total annual commercial fishery landings (landed weight in pounds) and value dollars by fish species for Inner Long Point Bay, 2012.

Species	Total Landing[a]	Total Value
Bowfin	16,823	$19,626
Brown Bullhead	22,930	$9,871
Carp	7,362	$2,691
Freshwater Drum	127	$27
Lepomis spp. (Sunfish)	14,731	$23,844
Mudpuppy	2,944	$2,843
Northern Pike	11,140	$5,339
Rock Bass	5,344	$5,972
White Perch	292	$203
Yellow Perch	8,411	$19,632
Mixed[b]	1,057	$1,641
Total Landing (lbs.)	91,161	
Total Value ($)		$91,689

[a] Only Inner Long Point Bay.
[b] A variety of incidentally caught species of little or no value.

3. LAKE ERIE SPORT FISHERY DIARY PROGRAM

The Lake Erie Sport Fishery Diary Program is an ongoing survey that tracks general trends in catch rates and angler activity targeting a variety of fish species. The program entered its 29th year in 2012. The survey area is illustrated in Figure 3.1. For this program, volunteer anglers complete a page in a diary for each trip taken. Fishing location, duration, numbers of fish kept and released and biological information are also recorded. Information such as fish health or unusual sightings of exotic species or fish disease is also recorded in the diary. The participants receive a summary of personal fishing activities with the number of fish caught and harvested by species and area, personal catch rate, a summary of biological information from their catch, a certificate of appreciation, and a summary of all data from Lake Erie and Lake St. Clair anglers.

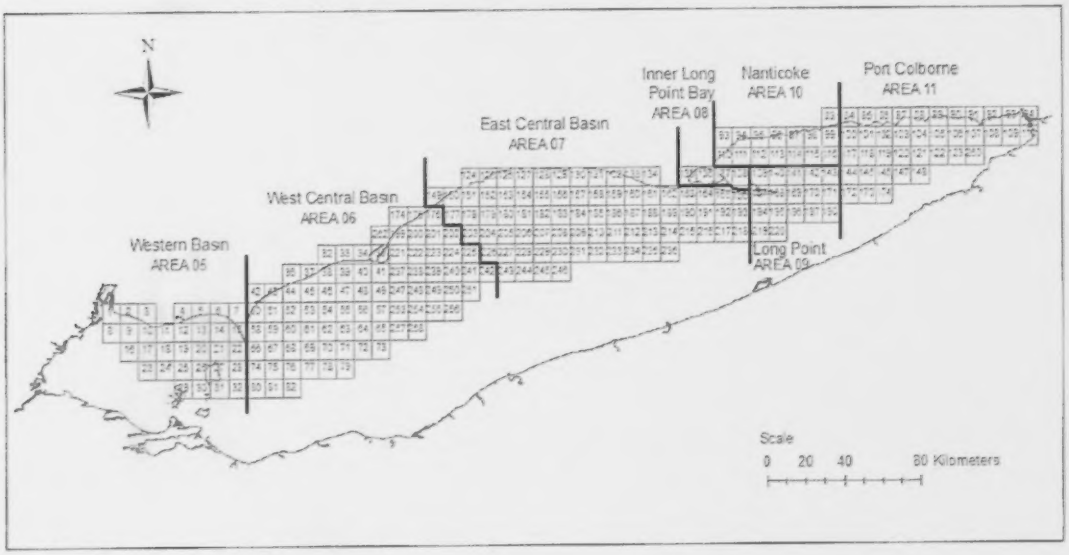

Figure 3.1 Lake Erie Sport Fishery Diary Survey Areas, 2012.

In 2012, 59 volunteers from Ontario completed angler diaries in Lake Erie. This was down from 74 participants in 2011. Of these volunteers, 46 (78%) have been participating in the program for three years or more. Thirty-six participants (61%) have been involved in the program for twelve years or more and 21 participants (36%) have been involved in the program for twenty or more years.

In the Sport Fishery Diary Program, Lake Erie is divided into seven areas, Western Basin (Area 05), West-Central Basin (Area 06), East-Central Basin (Area 07), Inner Long Point Bay (Area 08), Long Point Bay (Area 09), Nanticoke (Area 10) and Port Colborne (Area 11). Angler catches are reported by 5 minute grid location within these areas (Figure 3.1).

Total diarist effort and catch for each area is presented in Tables 3.1, 3.2 and 3.3. Observed catch rates of selected preferred species by area, for the years 1990 to 2012, are presented in Tables 3.4, 3.5, 3.6 and 3.7. Effort may be directed at multiple species simultaneously, therefore, the percentages of annual effort directed at species can total more than 100% in Figures 3.2 to 3.4.

Western Basin (Area 05)

Eighteen participants completed diaries that included western basin fishing effort. Western basin diarists fished 1,516 rod hours of effort over 127 fishing trips (Table 3.1). The majority of angling effort recorded by diarists in the western basin was directed towards Walleye (53%) and Yellow Perch (45%) (Table 3.4, Figure 3.2). Other species targeted with greater than 1% of effort include: Largemouth Bass (2%), Smallmouth Bass (2%) and Rainbow Trout (1%). Three hundred and forty eight Walleye were caught, and 5,215 Yellow Perch were caught in the western basin (Table 3.3).

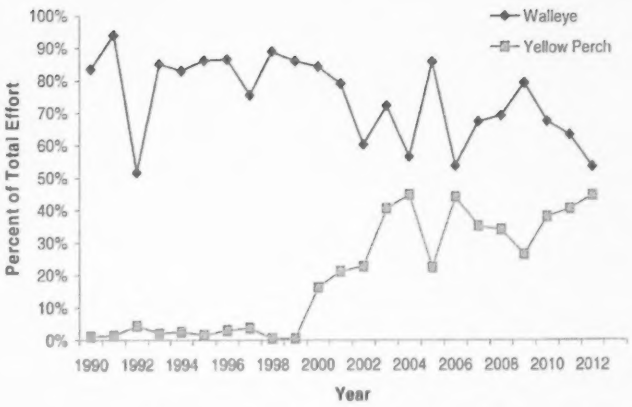

Figure 3.2 Western basin angler percent of area effort, Lake Erie Sport Diary Program, 1990-2012.

The Walleye catch per unit effort (CPUE) was 0.428 fish per rod hour; this was an increase of 8% from 2011 CPUE. The CPUE for Walleye was higher in the western basin (0.428 fish per rod hour) than in the central (0.177 fish per rod hour) and eastern basins (0.168 fish per rod hour) (Figure 3.5). The Yellow Perch CPUE was 7.721 fish per rod hour; this was an increase of 24% from 2011 CPUE (Figure 3.6).

Central Basin (Areas 06 and 07)

Thirty-six participants completed diaries that included central basin fishing effort. Central basin diarists fished 5,098 rod hours of effort over 217 fishing trips (Table 3.1). The majority of angling effort recorded by diarists in the central basin was directed towards Walleye (78%), Rainbow Trout (61%) and Yellow Perch (22%) (Figure 3.3). Rainbow Trout and Walleye are often targeted simultaneously. Three hundred and nineteen Rainbow Trout were caught, 707 Walleye were caught, and 8,918 Yellow Perch were caught in the central basin (Table 3.3).

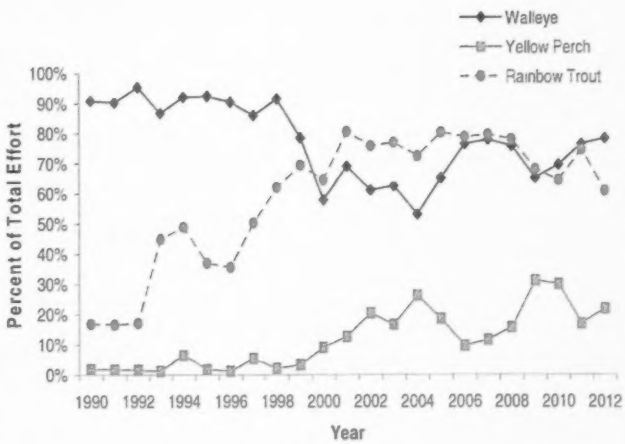

Figure 3.3 Central basin angler percent of area effort, Lake Erie Sport Diary Program, 1990-2012

The overall central basin Walleye CPUE was 0.177 fish per rod hour; this was an increase of 21% from 2011 CPUE (Figure 3.5). Walleye CPUE was higher in the east central basin (0.194 fish per rod hour) than the west central basin (0.169 fish per rod hour) (Table 3.5). The overall central basin Rainbow Trout CPUE was 0.098 fish per rod hour; this was a decrease of 12% from 2011 CPUE. Rainbow Trout CPUE was higher in the west central basin (0.122 fish per rod hour) than the east central basin (0.029 fish per rod hour) (Table 3.5). The overall central basin Yellow Perch CPUE was 7.996 fish per rod hour; this was an increase of 29% from the 2011 CPUE. Yellow Perch CPUE was higher in the east central basin (8.249 fish per rod hour) than the west central basin (7.299 fish per rod hour). The CPUE for Yellow Perch was the highest in the central (7.996 fish per rod hour) and western basins (7.721 fish per rod hour) compared to the eastern basin (4.903 fish per rod hour) (Figure 3.6).

Eastern Basin (Areas 08, 09, 10 and 11)

Twenty-eight participants completed diaries that included eastern basin fishing effort. Eastern basin diarists fished 2,620 rod hours of effort over 281 fishing trips (Table 3.1). The majority of angling effort recorded by diarists in the eastern basin was directed towards Yellow Perch (41%), Smallmouth Bass (32%) and Walleye (24%) (Figure 3.4). Other fish species targeted in the eastern basin included Largemouth Bass (9%), Northern Pike (5%), Rainbow Trout (<1%) and Longnose Gar (<1%). One hundred and five Walleye were caught, 1,040 Smallmouth Bass were caught, and 5,286 Yellow Perch were caught in the eastern basin (Table 3.3).

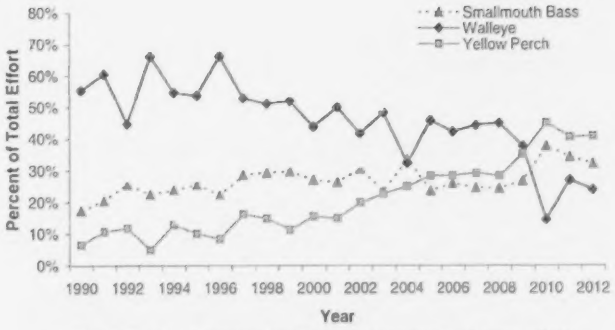

Figure 3.4 Eastern basin angler percent of area effort, Lake Erie Sport Diary Program, 1990-2012.

The overall eastern basin Yellow Perch CPUE was 4.903 fish per rod hour; this was an increase of 5% from the 2011 CPUE (Figure 3.6). Yellow Perch CPUE was highest in the inner Long Point Bay area (5.784 fish per rod hour) (Table 3.6). The overall eastern basin Smallmouth Bass CPUE was 1.058 fish per rod hour; this was a decrease of 8% from the 2011 CPUE. Smallmouth Bass CPUE was highest in the inner Long Point Bay area (1.207 fish per rod hour) (Table 3.6). The overall eastern basin Walleye CPUE was 0.168 fish per rod hour; this was a decrease of 9% from the 2011 CPUE (Figure 3.5). Walleye CPUE was highest in the Port Colborne area (0.171 fish per rod hour) (Table 3.7).

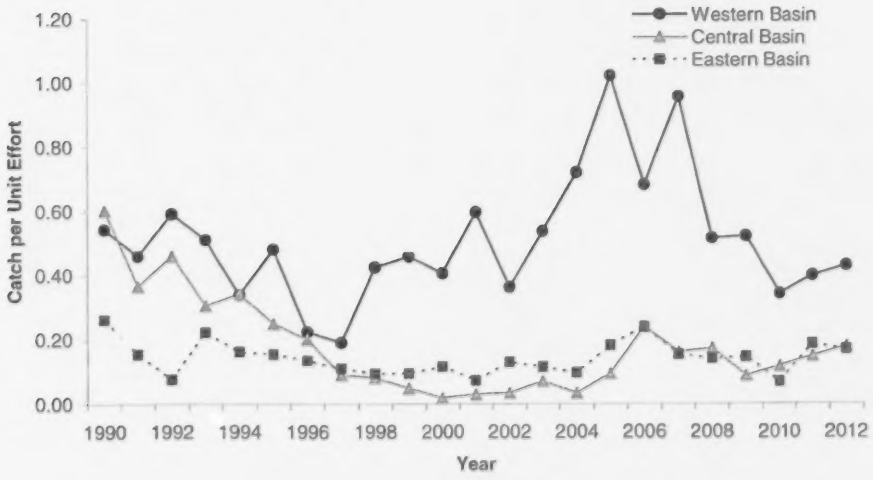

Figure 3.5 Walleye catch per unit effort (fish per rod hour) by basin, Lake Erie Sport Diary Program, 1990-2012.

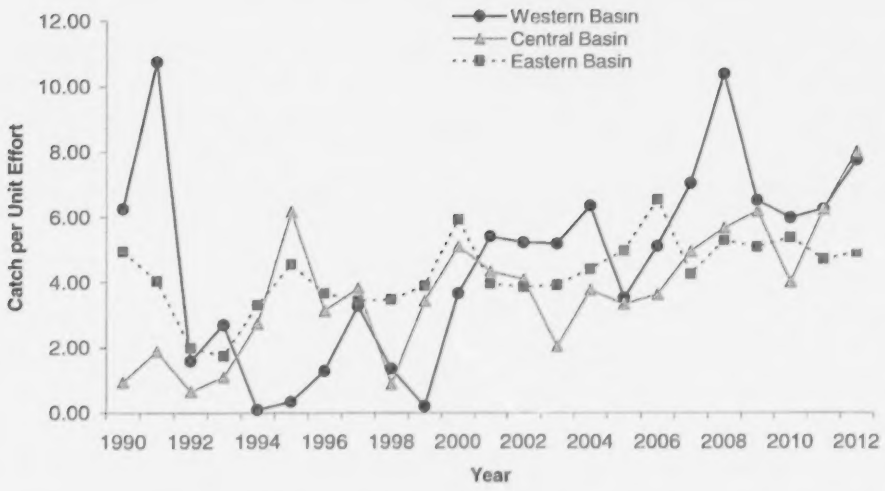

Figure 3.6 Yellow Perch catch per unit effort (fish per rod hour) by basin, Lake Erie Sport Diary Program 1990-2012.

Table 3.1 Total effort by survey area, reported by Sport Fishery Diary Program non-charter boat participants, 2012.

Survey Area	Number of Diarists	Number of Trips	Number of Rods per Trip	Total Rod Hours
Western Basin	18	127	2.9	1,516
West Central Basin	20	108	5.5	2,927
East Central Basin	18	109	4.1	2,171
Inner Long Point Bay	18	121	2.6	988
Long Point Bay	6	15	2.7	121
Nanticoke	9	97	2	687
Port Colborne	7	48	3.3	824
Total	**59[a]**	**625**	**3.4**	**9,234**

[a]Diarist may fish more than one survey area in a year.

Table 3.2 Total effort by survey area, reported by Sport Fishery Diary Program non-charter boat participants, 1986-2012.

Year	Western Basin			West-Central			East-Central			Inner Long Point Bay		
	No. of Diarists	Total Effort		No. of Diarists	Total Effort		No. of Diarists	Total Effort		No. of Diarists	Total Effort	
		Trips	Rod Hours		Trips	Rod Hours		Trips	Rod Hours		Trips	Rod Hours
1986	13	123	1,234	18	228	3,176	20	306	4,078	14	97	864
1987	10	118	1,272	30	392	5,323	34	355	4,794	18	150	1,462
1988	26	280	2,886	36	422	7,100	58	748	10,781	33	226	2,439
1989	33	244	2,175	33	421	4,883	45	444	4,412	49	229	2,139
1990	38	231	2,068	45	388	5,020	51	404	4,195	59	265	2,445
1991	34	234	2,538	38	318	3,841	60	474	5,719	50	311	2,917
1992	34	254	2,220	59	435	6,104	73	383	5,070	60	286	4,068
1993	39	306	4,428	48	428	6,537	51	407	4,995	56	331	3,347
1994	14	152	885	41	308	4,190	43	322	3,583	58	373	4,047
1995	35	157	1,209	58	382	6,248	47	267	2,762	61	442	4,798
1996	43	254	2,436	45	305	6,200	43	214	3,100	55	324	3,354
1997	29	145	1,499	40	265	6,691	37	224	3,573	80	564	5,881
1998	39	210	2,016	41	265	5,879	26	163	2,953	61	508	4,821
1999	22	112	1,066	37	208	4,826	29	176	2,767	65	383	3,809
2000	24	78	732	31	240	5,175	21	173	3,672	52	312	2,899
2001	24	88	833	28	147	3,769	20	142	2,457	53	236	2,449
2002	14	74	809	25	138	2,594	19	154	2,108	45	255	2,429
2003	20	147	1,508	26	191	3,690	21	142	2,190	45	203	1,882
2004	31	199	2,663	24	157	3,322	19	112	1,556	42	277	2,740
2005	26	204	2,638	27	174	4,351	25	186	3,669	45	200	2,121
2006	17	109	1,375	22	142	4,207	27	182	3,803	37	179	1,857
2007	12	95	929	25	158	4,374	20	166	3,960	34	176	1,932
2008	12	79	768	21	168	3,799	27	115	2,697	29	177	1,677
2009	22	150	2,618	24	138	3,322	19	107	2,198	24	174	1,803
2010	11	74	955	14	121	2,990	19	116	2,561	25	149	1,475
2011	18	99	1,506	29	148	3,937	20	120	2,479	23	152	1,538
2012	18	127	1,516	20	108	2,927	18	109	2,171	18	121	988
90-12 Avg.	**25**	**156**	**1,705**	**33**	**232**	**4,521**	**32**	**211**	**3,228**	**47**	**278**	**2,838**

Year	Long Point Bay			Nanticoke			Port Colborne			Total Lake Effort		
	No. of Diarists	Total Effort		No. of Diarists	Total Effort		No. of Diarists	Total Effort		No. of Diarists	Total Effort	
		Trips	Rod Hours		Trips	Rod Hours		Trips	Rod Hours		Trips	Rod Hours
1986	15	125	1,636	16	152	834	6	97	608	50	1,128	12,430
1987	15	65	781	15	150	572	9	172	1,499	66	1,402	15,703
1988	21	95	3,601	28	211	1,506	13	267	1,818	131	2,249	30,131
1989	45	289	3,607	46	371	3,318	12	271	2,060	146	2,269	22,594
1990	57	360	4,658	58	450	4,312	19	243	2,320	166	2,341	25,018
1991	51	239	2,961	53	377	3,787	33	392	3,966	189	2,345	25,729
1992	57	287	3,767	56	334	2,728	28	342	4,009	207	2,321	27,966
1993	54	285	3,685	55	364	3,698	24	262	3,242	185	2,383	29,933
1994	37	157	2,005	49	290	3,201	24	243	2,825	157	1,845	20,736
1995	35	132	1,949	34	177	1,737	39	361	4,849	198	1,918	23,551
1996	28	124	1,713	35	241	3,164	33	318	5,868	181	1,780	25,834
1997	30	102	1,690	38	219	2,683	56	518	9,129	203	2,037	31,145
1998	35	171	2,776	29	204	1,846	42	486	7,540	176	2,007	27,831
1999	29	138	2,488	34	203	1,765	44	397	7,319	174	1,617	24,041
2000	30	159	2,313	29	183	1,534	29	270	4,459	142	1,415	20,785
2001	29	136	1,791	27	156	1,195	27	213	4,418	132	1,118	16,913
2002	29	124	1,531	26	162	1,329	24	228	4,265	106	1,135	15,063
2003	21	78	979	26	166	1,603	24	169	3,273	113	1,096	15,125
2004	19	68	818	22	155	1,298	22	147	2,608	114	1,115	15,005
2005	21	82	1,030	23	187	1,634	19	175	3,143	113	1,208	18,585
2006	13	55	644	19	126	1,020	15	144	2,328	93	937	15,234
2007	9	33	363	19	128	1,080	17	132	2,757	82	888	15,394
2008	10	33	463	16	92	834	15	99	1,921	72	763	12,159
2009	7	33	390	14	138	1,070	18	107	1,986	84	847	13,388
2010	6	22	265	15	106	757	8	35	526	60	623	9,529
2011	4	17	139	11	84	659	12	76	1,202	74	696	11,459
2012	6	15	121	9	97	687	7	48	824	59	625	9,234
90-12 Avg.	**27**	**124**	**1,676**	**30**	**202**	**1,896**	**25**	**235**	**3,686**	**134**	**1,437**	**19,550**

Table 3.3 Total catch and harvest reported by sport fishery diary non-charter boat participants, Lake Erie Sport Fishery Diary Program, 2012.

Species	Western Basin		West-Central Basin		East-Central Basin		Inner Long Point Bay		Long Point Bay		Nanticoke		Port Colborne		Total	
	Caught	Harvested	Caught	Harvested	Caught	Harvested	Caught	Harvested	Caught	Harvested	Caught	Harvested	Caught	Harvested	Caught	Harvested
Longnose Gar									1				5		6	-
Rainbow Trout	6	6	289	233	30	30	1				1	1	1	1	328	271
Brown Trout			4	1											4	1
Lake Trout															-	-
Northern Pike	1		1				88	16	75	14					165	30
Muskellunge													1		1	-
Channel Catfish	6						7				1				14	-
White Perch	278	29	79								1		15		373	29
White Bass	173	7	586	72	35						4	1	8		806	80
Rock Bass	3				18	12	173	23	6	2	94	21			294	58
Pumpkinseed			1				3				3				7	-
Bluegill							2								2	-
Smallmouth Bass	26				1	1	730	521	58	37	198	54	54	7	1,067	620
Largemouth Bass	57		45				216	29	4		28		4		354	29
Black Crappie	3														3	-
Yellow Perch	5,215	3,719	2,172	2,002	6,746	5,240	1,705	734	78	26	2,462	1,495	1,041	825	19,419	14,041
Walleye	348	317	445	416	262	262					1	1	104	97	1,160	1,093
Round Goby					317	63					16	6	39	32	372	101
Freshwater Drum	362		467	12	120		19		2		7		11		988	12
Total	**6,478**	**4,078**	**4,089**	**2,736**	**7,529**	**5,608**	**2,944**	**1,323**	**224**	**79**	**2,816**	**1,579**	**1,283**	**962**	**25,363**	**16,365**

Table 3.4 Angler success rates (CPUE) of non-charter boat anglers targeting particular species, western basin survey area, Lake Erie, 1990-2012[a]. Effort may be directed at more than one species simultaneously.

Western Basin (Area 05)									
Year	Total Rod Hours	Walleye				Yellow Perch			
		Trips	Rod Hours	CPUE	% Total Effort	Trips	Rod Hours	CPUE	% Total Effort
1990	2,304	212	1,924	0.542	84%	5	25	6.240	1%
1991	2,405	211	2,259	0.459	94%	2	33	10.738	1%
1992	3,087	203	1,591	0.591	52%	15	135	1.574	4%
1993	2,220	279	1,887	0.510	85%	9	44	2.689	2%
1994	885	126	734	0.339	83%	4	22	0.090	2%
1995	1,204	136	1,036	0.479	86%	3	18	0.333	1%
1996	2,428	213	2,097	0.223	86%	12	71	1.275	3%
1997	1,499	91	1,131	0.189	75%	10	54	3.258	4%
1998	2,016	171	1,791	0.423	89%	2	9	1.347	0%
1999	1,071	91	919	0.457	86%	1	5	0.188	0%
2000	729	64	613	0.405	84%	8	117	3.641	16%
2001	833	66	657	0.594	79%	24	175	5.383	21%
2002	809	54	486	0.362	60%	13	183	5.197	23%
2003	1,508	102	1,087	0.534	72%	60	609	5.158	40%
2004	2,663	114	1,499	0.717	56%	93	1,187	6.325	45%
2005	2,638	173	2,254	1.020	85%	42	588	3.505	22%
2006	1,375	68	735	0.679	53%	44	604	5.082	44%
2007	929	56	624	0.954	67%	39	326	7.012	35%
2008	768	39	529	0.512	69%	42	260	10.360	34%
2009	2,618	93	2,068	0.519	79%	64	687	6.490	26%
2010	955	33	642	0.340	67%	44	362	5.963	38%
2011	1,506	36	950	0.397	63%	65	608	6.230	40%
2012	1,516	42	808	0.428	53%	82	675	7.721	45%
90-12 Avg.	**1,651**	**116**	**1,231**	**0.508**	**74%**	**30**	**295**	**4.600**	**12%**

[a]CPUE represents observed catch divided by observed angling effort in rod-hours directed at that particular species.

Table 3.5 Angler success rates (CPUE) of non-charter boat anglers targeting particular species, west-central and east-central basins survey areas, Lake Erie, 1990-2012[a]. Effort may be directed at more than one species simultaneously.

West-Central Basin (Area 06)

Year	Total Rod Hours	Walleye				Rainbow Trout				Yellow Perch			
		Trips	Rod Hours	CPUE	% Total Effort	Trips	Rod Hours	CPUE	% Total Effort	Trips	Rod Hours	CPUE	% Total Effort
1990	5,020	328	4,326	0.642	86%	54	1,031	0.010	21%	11	59	0.659	1%
1991	3,841	287	3,488	0.366	91%	26	441	0.032	11%	4	27	0.679	1%
1992	6,104	410	5,886	0.501	96%	54	733	0.056	12%	10	96	0.385	2%
1993	6,537	395	5,081	0.308	78%	231	3,217	0.118	49%	14	94	1.521	1%
1994	4,190	279	3,670	0.373	88%	172	2,271	0.086	54%	20	466	2.923	11%
1995	6,248	348	5,768	0.215	92%	150	2,893	0.055	46%	11	130	6.243	2%
1996	6,200	244	5,543	0.213	89%	89	2,070	0.049	33%	6	50	5.500	1%
1997	6,691	201	5,912	0.077	88%	122	3,909	0.083	58%	4	36	9.103	1%
1998	5,879	224	5,298	0.076	90%	138	3,191	0.117	54%	4	18	3.611	0%
1999	4,826	146	3,865	0.033	80%	140	3,611	0.110	75%	2	20	11.150	0%
2000	4,251	124	2,498	0.011	59%	154	3,013	0.308	71%	5	46	2.863	1%
2001	3,769	82	2,596	0.016	69%	131	3,554	0.136	94%	9	99	5.088	3%
2002	2,594	75	1,656	0.013	64%	121	2,402	0.275	93%	14	126	3.852	5%
2003	3,690	126	2,343	0.046	63%	161	3,288	0.234	89%	16	186	4.047	5%
2004	3,322	74	1,951	0.037	59%	118	2,827	0.187	85%	37	442	6.117	13%
2005	4,351	86	2,525	0.069	58%	132	3,812	0.185	88%	38	520	4.215	12%
2006	4,207	91	3,058	0.215	73%	118	3,733	0.200	89%	9	145	5.253	3%
2007	4,374	95	3,220	0.149	74%	106	3,578	0.220	82%	30	274	7.935	6%
2008	3,799	98	2,814	0.160	74%	110	3,149	0.254	83%	48	433	7.277	11%
2009	3,322	74	2,553	0.071	77%	85	2,841	0.132	86%	46	466	2.088	14%
2010	2,990	74	2,451	0.053	82%	75	2,528	0.243	85%	40	370	4.464	12%
2011	3,937	98	3,163	0.121	80%	100	3,337	0.132	85%	33	347	5.202	9%
2012	2,927	87	2,637	0.169	90%	74	2,284	0.122	78%	20	296	7.299	10%
90-12 Avg.	**4,481**	**176**	**3,578**	**0.171**	**78%**	**116**	**2,770**	**0.145**	**66%**	**19**	**206**	**4.673**	**5%**

East-Central Basin (Area 07)

Year	Total Rod Hours	Walleye				Rainbow Trout				Yellow Perch			
		Trips	Rod Hours	CPUE	% Total Effort	Trips	Rod Hours	CPUE	% Total Effort	Trips	Rod Hours	CPUE	% Total Effort
1990	4,195	385	4,045	0.559	96%	40	517	0.006	12%	11	110	1.091	3%
1991	5,719	415	5,133	0.367	90%	88	1,138	0.090	20%	8	134	2.111	2%
1992	5,070	358	4,757	0.410	94%	70	1,169	0.023	23%	12	77	0.978	2%
1993	4,995	396	4,912	0.304	98%	153	1,945	0.055	39%	7	44	0.182	1%
1994	3,583	310	3,475	0.309	97%	131	1,521	0.007	42%	2	37	0.270	1%
1995	2,762	249	2,547	0.326	92%	39	426	0.068	15%	5	27	5.704	1%
1996	3,100	190	2,853	0.176	92%	72	1,231	0.059	40%	9	57	1.035	2%
1997	3,573	143	2,902	0.115	81%	54	1,241	0.088	35%	69	514	3.426	14%
1998	2,953	138	2,767	0.088	94%	103	2,278	0.119	77%	24	161	0.567	5%
1999	3,708	133	2,825	0.069	76%	97	2,302	0.135	62%	38	252	2.803	7%
2000	1,522	52	840	0.037	55%	41	708	0.072	47%	61	470	5.291	31%
2001	2,457	67	1,697	0.048	69%	58	1,455	0.056	59%	70	684	4.199	28%
2002	2,108	55	1,217	0.061	58%	52	1,160	0.109	55%	91	828	4.101	39%
2003	2,190	65	1,329	0.110	61%	55	1,231	0.068	56%	71	784	1.534	36%
2004	1,556	38	632	0.019	41%	40	698	0.119	45%	66	831	2.475	53%
2005	3,669	109	2,688	0.116	73%	101	2,617	0.123	71%	76	957	2.829	26%
2006	3,803	124	3,054	0.262	80%	100	2,571	0.072	68%	47	615	3.221	16%
2007	3,960	115	3,255	0.170	82%	107	3,040	0.116	77%	48	680	3.722	17%
2008	2,697	81	2,102	0.186	78%	72	1,913	0.056	71%	33	583	4.431	22%
2009	2,198	40	1,041	0.123	47%	34	912	0.115	41%	69	1,253	7.683	57%
2010	2,561	53	1,406	0.228	55%	40	1,044	0.083	41%	66	1,287	3.856	50%
2011	2,479	64	1,731	0.195	70%	52	1,438	0.063	58%	54	740	6.699	30%
2012	2,171	53	1,348	0.194	62%	30	819	0.029	38%	54	818	8.249	38%
90-12 Avg.	**3,175**	**158**	**2,546**	**0.194**	**76%**	**71**	**1,451**	**0.075**	**47%**	**43**	**519**	**3.324**	**21%**

[a]CPUE represents observed catch divided by observed angling effort in rod-hours directed at that particular species.

Table 3.6 Angler success rates (CPUE) of non-charter boat anglers targeting particular species, Inner Long Point Bay and Long Point Bay survey areas, Lake Erie, 1990-2012[a]. Effort may be directed at more than one species simultaneously.

Inner Long Point Bay (Area 08)

Year	Total Rod Hours	Smallmouth Bass				Yellow Perch				Largemouth Bass				Northern Pike			
		Trips	Rod Hours	CPUE	% Total Effort	Trips	Rod Hours	CPUE	% Total Effort	Trips	Rod Hours	CPUE	% Total Effort	Trips	Rod Hours	CPUE	% Total Effort
1990	3,409	169	1,735	0.718	51%	21	167	5.886	5%	16	554	0.806	16%	22	191	0.272	6%
1991	2,614	161	1,633	0.838	62%	46	492	5.301	19%	16	717	0.958	27%	26	312	0.183	12%
1992	4,658	214	2,304	0.708	49%	47	438	2.172	9%	17	1,534	0.633	33%	38	550	0.167	12%
1993	3,347	196	2,008	0.626	60%	27	209	1.937	6%	19	1,430	0.774	43%	28	239	0.301	7%
1994	4,047	171	2,030	0.656	50%	80	933	3.911	23%	16	1,305	0.850	32%	47	418	0.256	10%
1995	4,798	203	2,298	0.657	48%	69	859	4.714	18%	22	2,233	0.740	47%	59	626	0.241	13%
1996	3,354	156	1,735	0.788	52%	53	601	3.825	18%	11	1,111	0.678	33%	29	291	0.179	9%
1997	5,881	282	3,145	0.870	53%	176	1,903	4.045	32%	24	1,551	0.661	26%	54	542	0.266	9%
1998	4,821	235	2,391	0.858	50%	150	1,519	3.829	32%	19	1,111	0.781	23%	76	742	0.259	15%
1999	3,811	188	2,097	0.643	55%	110	1,034	4.080	27%	15	734	0.917	19%	56	517	0.330	14%
2000	2,899	148	1,563	0.826	54%	87	887	6.263	31%	14	640	0.879	22%	32	312	0.514	11%
2001	2,449	121	1,363	0.747	56%	65	698	4.081	29%	13	592	0.994	24%	24	191	0.419	8%
2002	2,429	136	1,463	0.896	60%	64	615	3.777	25%	14	676	1.241	28%	16	114	0.167	5%
2003	1,882	116	1,191	1.112	63%	40	478	3.812	25%	12	437	1.183	23%	13	85	0.495	5%
2004	2,740	125	1,526	0.624	56%	78	712	4.015	26%	83	617	1.276	23%	23	236	0.246	9%
2005	2,121	83	1,084	0.720	51%	70	779	7.923	37%	55	489	2.022	23%	12	135	1.049	6%
2006	1,857	87	1,063	1.004	57%	66	572	9.042	31%	25	255	1.838	14%	24	210	0.694	11%
2007	1,932	81	1,024	0.845	53%	75	806	4.905	42%	30	351	1.621	18%	18	191	0.470	10%
2008	1,677	85	995	1.033	59%	77	672	5.938	40%	28	260	1.468	16%	22	121	0.818	7%
2009	1,803	81	1,013	0.869	56%	71	745	5.836	41%	16	142	1.837	8%	18	158	0.501	9%
2010	1,475	62	753	0.873	51%	74	672	7.752	46%	22	200	1.464	14%	8	72	0.294	5%
2011	1,538	88	986	1.147	64%	54	581	6.204	38%	29	258	1.084	17%	3	33	0.452	2%
2012	988	62	574	1.207	58%	43	289	5.784	29%	23	207	0.975	21%	8	61	0.836	6%
90-12 Avg.	**2,893**	**141**	**1,564**	**0.838**	**55%**	**71**	**724**	**5.001**	**27%**	**23**	**757**	**1.117**	**24%**	**29**	**276**	**0.409**	**9%**

Long Point Bay (Area 09)

Year	Total Rod Hours	Rainbow Trout				Walleye				Northern Pike				Smallmouth Bass			
		Trips	Rod Hours	CPUE	% Total Effort	Trips	Rod Hours	CPUE	% Total Effort	Trips	Rod Hours	CPUE	% Total Effort	Trips	Rod Hours	CPUE	% Total Effort
1990	4,304	22	397	0.048	9%	265	3,456	0.205	80%	9	101	0.446	2%	32	381	0.855	9%
1991	2,793	22	266	0.098	10%	160	2,005	0.125	72%	13	174	0.189	6%	28	330	1.074	12%
1992	3,829	89	1,170	0.143	31%	141	1,909	0.046	50%	2	9	0.000	0%	28	380	0.708	10%
1993	3,685	113	1,631	0.072	44%	222	3,006	0.164	82%	6	76	0.132	2%	47	450	1.044	12%
1994	2,005	70	997	0.022	50%	112	1,581	0.089	79%	0	0	0.000	0%	29	293	1.453	15%
1995	1,949	24	390	0.067	20%	87	1,389	0.086	71%	0	0	0.000	0%	31	345	1.216	18%
1996	1,713	20	321	0.044	19%	78	1,316	0.105	77%	0	0	0.000	0%	43	361	1.528	21%
1997	1,642	24	536	0.030	33%	49	998	0.028	61%	11	116	0.586	7%	39	492	1.229	30%
1998	2,776	61	1,114	0.069	40%	101	1,849	0.051	67%	9	83	0.545	3%	40	586	0.843	21%
1999	2,008	65	1,021	0.094	51%	56	974	0.024	49%	16	224	0.869	11%	28	357	1.150	18%
2000	2,313	100	1,647	0.241	71%	73	1,148	0.017	50%	16	144	3.395	6%	8	70	0.892	3%
2001	1,791	82	1,196	0.135	67%	56	903	0.050	50%	22	182	2.764	10%	11	128	0.476	7%
2002	1,531	87	1,157	0.079	76%	35	424	0.012	28%	20	217	0.661	14%	20	200	0.802	13%
2003	979	50	729	0.064	74%	34	509	0.016	52%	16	130	0.559	13%	12	118	0.834	12%
2004	818	40	583	0.067	71%	24	338	0.012	41%	10	82	0.540	10%	8	53	1.258	7%
2005	1,030	50	658	0.059	64%	41	548	0.055	53%	8	77	0.506	7%	20	244	0.775	24%
2006	644	18	306	0.095	47%	17	310	0.132	48%	8	74	0.952	11%	16	136	1.547	21%
2007	363	8	117	0.232	32%	6	112	0.099	31%	8	84	1.485	23%	9	86	1.291	24%
2008	463	17	290	0.007	62%	15	298	0.024	64%	26	157	0.712	34%	4	29	0.655	6%
2009	390	6	115	0.000	29%	6	115	0.000	29%	11	133	0.278	34%	16	181	0.838	46%
2010	265	0	0	0.000	0%	0	0	0.000	0%	10	106	1.349	40%	12	159	1.279	60%
2011	139	0	0	0.000	0%	0	0	0.000	0%	9	94	0.786	68%	7	42	2.583	30%
2012	121	1	9	0.000	7%	1	9	0.000	7%	6	53	1.415	44%	8	57	0.792	47%
90-12 Avg.	**1,633**	**42**	**637**	**0.072**	**39%**	**69**	**1,009**	**0.058**	**50%**	**10**	**101**	**0.790**	**15%**	**22**	**238**	**1.092**	**20%**

[a]CPUE represents observed catch divided by observed angling effort in rod-hours directed at that particular species.

Table 3.7 Angler success rates (CPUE) of non-charter boat anglers targeting particular species, Nanticoke and Port Colborne survey areas, Lake Erie, 1990-2012[a]. Effort may be directed at more than one species simultaneously.

Nanticoke (Area 10)

Year	Total Rod Hours	Yellow Perch				Walleye				Rainbow Trout				Smallmouth Bass			
		Trips	Rod Hours	CPUE	% Total Effort	Trips	Rod Hours	CPUE	% Total Effort	Trips	Rod Hours	CPUE	% Total Effort	Trips	Rod Hours	CPUE	% Total Effort
1990	4,123	101	548	6 812	13%	292	3,412	0.336	83%	42	534	0.021	13%	49	357	0.745	9%
1991	3,424	62	491	4.792	14%	213	2,301	0.169	67%	11	106	0.095	3%	55	330	1.011	10%
1992	2,769	98	824	2.445	30%	155	1,359	0.098	49%	24	225	0.111	8%	116	863	1.242	31%
1993	3,698	34	232	2.660	6%	270	3,062	0.229	83%	61	720	0 071	19%	54	455	1.019	12%
1994	3,201	48	288	3.824	9%	196	2,585	0.170	81%	51	476	0.013	15%	46	348	0.844	11%
1995	1,737	57	338	5.546	19%	118	1,395	0.166	80%	7	123	0 016	7%	27	221	0.862	13%
1996	3,164	71	405	4.581	13%	155	2,513	0.144	79%	28	288	0.076	9%	32	366	0.604	12%
1997	2,683	96	778	3.082	29%	91	1,476	0.041	55%	29	405	0.027	15%	55	552	1.052	21%
1998	1,846	93	571	3 641	31%	68	836	0.059	45%	34	367	0.037	20%	54	465	1.273	25%
1999	1,765	70	354	5.601	20%	62	760	0.043	43%	35	488	0.044	28%	73	696	1.495	39%
2000	1,534	91	593	6.945	39%	27	337	0.012	22%	30	339	0.121	22%	54	458	2.900	30%
2001	1,195	67	469	4 584	39%	33	269	0.007	23%	39	368	0.076	31%	49	413	2 091	35%
2002	1,329	116	901	4.849	68%	20	152	0.000	11%	23	176	0.079	13%	24	345	1.115	26%
2003	1,603	118	1,032	4.247	64%	18	257	0.047	16%	19	251	0.064	16%	22	245	1.806	15%
2004	1,298	129	1,041	4.714	80%	4	64	0.016	5%	7	80	0 075	6%	29	273	1.504	21%
2005	1,634	140	1,107	4.093	68%	21	296	0.034	18%	26	313	0 086	19%	18	165	1.706	10%
2006	1,020	108	804	4.959	79%	14	188	0.069	18%	11	156	0.019	15%	6	44	1 545	4%
2007	1,080	90	644	3.893	60%	20	272	0.048	25%	23	287	0.153	27%	12	114	1.982	11%
2008	834	68	507	4.467	61%	13	223	0.130	27%	11	187	0.048	22%	7	53	2 110	6%
2009	1,070	119	847	5 074	79%	9	163	0.012	15%	5	74	0.054	7%	10	72	1 437	7%
2010	757	87	582	3.235	77%	3	34	0.059	4%	0	0	0.000	0%	15	113	1.113	15%
2011	659	77	584	3.361	89%	1	12	0.083	2%	1	12	0.000	2%	12	110	0 444	17%
2012	687	83	566	4.346	82%	1	12	0 083	2%	1	12	0.083	2%	14	116	0.879	17%
90-12 Avg.	**1,874**	**88**	**631**	**4.424**	**46%**	**78**	**956**	**0.089**	**37%**	**23**	**260**	**0.060**	**14%**	**36**	**312**	**1.338**	**17%**

Port Colborne (Area 11)

Year	Total Rod Hours	Walleye				Smallmouth Bass				Yellow Perch			
		Trips	Rod Hours	CPUE	% Total Effort	Trips	Rod Hours	CPUE	% Total Effort	Trips	Rod Hours	CPUE	% Total Effort
1990	3,889	165	1,763	0.229	45%	30	250	0.556	6%	47	226	1.142	6%
1991	3,965	290	3,357	0.163	85%	48	322	0 848	8%	52	283	0.993	7%
1992	4,009	91	3,449	0.085	86%	52	352	0.727	9%	63	429	0.876	11%
1993	3,242	220	3,085	0.273	95%	24	221	0 647	7%	32	214	0.829	7%
1994	2,825	184	2,388	0.202	85%	33	217	0 852	8%	33	261	1.091	9%
1995	4,849	294	4,229	0.174	87%	60	537	1 354	11%	12	113	0.585	2%
1996	5,868	256	5,286	0.138	90%	55	658	1 072	11%	15	134	0.427	2%
1997	9,129	356	7,443	0.135	82%	135	1,329	1.311	15%	47	411	0.481	5%
1998	7,540	310	5,900	0.112	78%	150	1,526	1.361	20%	54	307	0.695	4%
1999	7,231	250	5,790	0.113	80%	117	1,232	1.365	17%	28	201	0.801	3%
2000	4,459	165	3,383	0.159	76%	91	924	1 943	21%	13	143	0.491	3%
2001	4,418	150	3,678	0.082	83%	46	675	0.911	15%	18	141	0.817	3%
2002	4,265	138	3,316	0.151	78%	78	897	0 860	21%	23	267	1.815	6%
2003	3,273	121	2,859	0.141	87%	34	243	0.944	7%	17	160	2.307	5%
2004	2,608	87	1,991	0.113	76%	61	632	1 357	24%	3	34	2.537	1%
2005	3,143	134	2,749	0.222	87%	36	373	0.981	12%	13	248	0.275	8%
2006	2,328	103	1,948	0.272	84%	25	264	1.770	11%	16	156	4.450	7%
2007	2,756	98	2,306	0.167	84%	19	277	0 766	10%	23	248	2.101	9%
2008	1,921	71	1,655	0.162	86%	13	111	0.840	6%	17	143	2.646	7%
2009	1,986	77	1,688	0.168	85%	10	133	0.211	7%	25	228	2.860	11%
2010	526	24	387	0.067	73%	9	111	0 378	21%	4	38	3.893	7%
2011	1,202	50	938	0.185	78%	8	74	1.389	6%	26	261	4.279	22%
2012	824	20	604	0.172	73%	10	95	0 537	12%	21	203	5.107	25%
90-12 Avg.	**3,750**	**159**	**3.052**	**0.160**	**81%**	**50**	**498**	**1.000**	**12%**	**26**	**211**	**1.804**	**7%**

[a]CPUE represents observed catch divided by observed angling effort in rod-hours directed at that particular species

4. INDEX FISHING PROJECTS

4.1 Partnership Index Fishing: Gill Netting

Partnership index gill netting is a cooperative fisheries assessment program with the Ontario Commercial Fisheries' Association (OCFA). Field work and laboratory sampling are funded through a service agreement with the OCFA. Prior to 1998, the program relied on volunteer participation from the fishing industry to complete the field component. This program has monitored abundance, age structure, size, and species composition throughout Lake Erie since 1989. Data from this community index are applied in catch-at-age analyses to estimate population abundance of Yellow Perch and Walleye. Population estimates are fundamental to the international allocation process for these species.

The lakewide survey was partitioned spatially into projects defined as the west, west-central, east-central, Pennsylvania Ridge, and eastern basins. In 2012, a total of 142 sites were fished across Lake Erie (Figure 4.1.1). In addition to randomly assigned east basin sites, nine (9) extra random sites were fished east of 79° 40' (referred to as the *Walleye Cap Area*) to ensure that a minimum of 20 sites were fished in this area to monitor the effectiveness of management efforts. The vessel that conducted the field work in 2012 was equipped with a GPS transponder allowing verification of coordinates fished. Since 2003, gill nets 110 feet in length with a mesh size of 4.75" (121 mm), 50 meshes deep were fished canned (suspended) at the same depths as canned index nets to examine the effectiveness of index gear catching suspended Walleye. These nets were approximately 17 feet deep with 3.1 times the area of the 50' index nets. Mean Walleye catch and size distributions in 2012 are presented for index and auxiliary gear. Also in 2012, additional 1 fathom canned index nets were fished at 12 random sites in both the west-central and east-central basin surveys. These shallow suspended gangs were intended to provide additional information describing the vertical distribution of Walleye in the central basin. For the first time in Partnership surveys, additional auxiliary gear was fished in order to contribute to the standardization of interagency assessment gill nets. In 2012, multifilament index gill nets identical to those fished by Ohio Department of Natural Resources were fished adjacent to canned Partnership index monofilament nets at 10 locations across the west and central basin. Preliminary results are reported here.

The index gill nets consisted of 1,250 feet (0.38 km) panels of graded monofilament mesh including 1.25", 1.5", 1.75", 2.0", 2.25", 2.5", 2.75", 3.0", 3.5", 4.0", 4.5", 5.0", 5.5", and 6.0" (32 mm to 152 mm). Mesh sizes 2 inches (57 mm) and greater were composed of two 50 foot panels, and those less than 2 inches were single panels 50 feet (15.25 m) in length. Sets were approximately 24 hours in duration.

Nets were set at randomly selected locations among depth strata. The number of sites within each stratum was proportional to lake area. Depth strata for the western basin included 0 to 10 m and greater than 10 m. In the west-central and east-central basins, depths were grouped as 0 to 15 m, 15 to 20 m, and greater than 20 m. The eastern basin and Pennsylvania Ridge depth strata were partitioned as 0 to 15 m, 15 to 30 m and depths greater than 30 m. The number of locations fished in the west, west-central, east-central, Pennsylvania Ridge, east, and extra cap area sites were 22, 36, 36, 9, 30, and 9 respectively.

At each site, nets were fished on the bottom and suspended (canned) at depths determined partly by the particular depth stratum and by random selection. In the western basin, nets were canned at 1 fathom (1.8 m). In the west-central and east-central basins, gill nets were canned at 2.7 fathoms (5 m) or 6.0 fathoms (11 m) or 9.2 fathoms (17 m). As usual, the central basin surveys were fished following fall turnover, when the water temperature was uniform throughout the water column. Twelve additional gangs of 1 fathom index nets were fished in addition to the standard complement of canned nets in the west-central and east-central basins, as described above.

In the deeper study areas (Pennsylvania Ridge, and east basin including the Walleye Cap Area), index gear was fished during thermal stratification. The gear was fished in the standard manner with gill nets set on bottom and canned at 2 fathoms (3.7 m), 4 fathoms (7.3 m), or 8 fathoms (14.6 m) at

all sites. Additional canned nets were fished in the thermocline in 2012 at sites with depths sufficient for a hypolimnion (cold bottom layer) to exist.

All Walleye and Yellow Perch were scanned for passive integrated transponder (PIT) tags using a Biomark reader with a racket antenna as bags of fish caught in index gear were removed from totes. All fish were identified, counted and weighed "in bulk" by species and mesh size. Biological sampling for selected species included determination of length, weight, sex, maturity, gonad weight and age. In addition to standard scale sample collection, sagittal otolilths were collected from Yellow Perch, Walleye, Burbot, Lake Whitefish and Smallmouth Bass greater than 30 cm in length. Otoliths were collected from Yellow Perch 15 cm and greater in total length caught in bottom nets, while scales were used to age smaller Yellow Perch. For Yellow Perch caught in canned nets, scales were used for aging, but otoliths were also collected and aged for fish longer than 250 mm. Otoliths were collected from all Walleye 38 cm and larger, and from subsamples of catches of smaller Walleye (minimum of 6 per site). Lake Trout heads were retained to recover coded wire tags present in stocked Lake Trout. In 2012, all species were examined for lamprey scars and wounds. Salmonids were examined for the presence of fin clips. Results from surveys include total catches, mean species biomass and age specific information for Yellow Perch, Walleye and Lake Whitefish. Catch rates presented have not been adjusted for selectivity bias associated with the gang configuration of mesh sizes.

Index fishing began August 24, 2012 in the Pennsylvania Ridge area, progressing eastward until eastern Lake Erie was completed on September 6, 2012. Fishing began in the western basin on September 9, 2012 and was completed by September 16, 2012. Fall turnover occurred by the first week of October, allowing the survey to commence in the west-central basin on October 1. The east-central basin survey was completed by October 25. Index fishing was conducted lakewide aboard the L. R. Jackson.

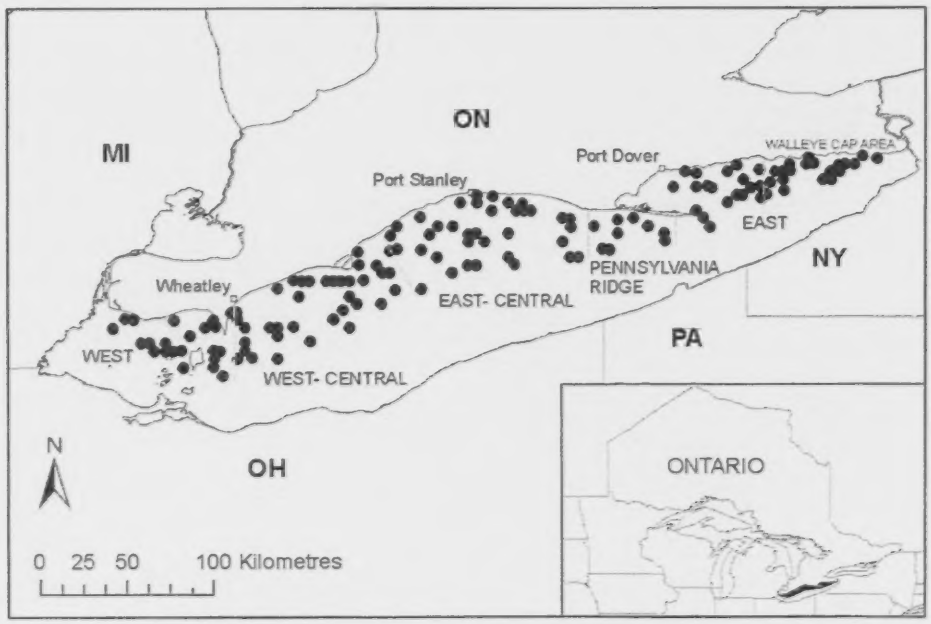

Figure 4.1.1 Lake Erie Partnership Index Fishing gill netting locations (dots) fished in 2012.

Results

Fish Community

Catch in numbers by species over the time series is presented for the west, west-central, east-central, Pennsylvania Ridge, east basin and the eastern Walleye Cap Area in Tables 4.1.1 to 4.1.6 respectively. Catches were standardized to an equal number of gangs as specified in Tables 4.1.1 to 4.1.6. The reference number of gangs in this report reflects the target number of gangs as targets have usually been met since the lakewide index fishing tender process began in 1999. Note that results for the Walleye Cap Area (Table 4.1.6) include fish caught in the east basin survey (Table 4.1.5) at sites east of 79° 40'. Tables 4.1.1 to 4.1.5 include only catches in standard bottom and canned monofilament nets whereas Table 4.1.6 also includes catches from nets fished in the thermocline in the Walleye Cap Area as this gear was fished throughout this shorter time series. Lakewide catches in monofilament index gill nets fished at all depths are presented in Table 4.1.7a (1989-1999) and Table 4.1.7b (2000-2012) with corresponding sampling effort by gear.

Alewife abundance in Lake Erie has been low since 2003. This trend appears to be changing as a total of 2,954 Alewives were caught in the 2012 surveys (Table 4.1.7b). While Alewives were caught in all surveys, the majority were caught in the eastern half of Lake Erie where 2012 catches approached average levels for each respective time series (Tables 4.1.3 - 4.1.6). Young-of-the-year Alewife were present in west, west-central and east-central basin surveys, but were not caught in the Pennsylvania Ridge, east basin or Walleye Cap Area surveys. Gizzard Shad abundance was above average in all surveys with young-of-the-year abundance representing more than half the catches in the west and central basin surveys if effort were standardized across mesh sizes (Table 4.1.1 to 4.1.6). YOY Gizzard Shad were not abundant in east basin surveys. White Perch catches in 2012 were above average in all areas of Lake Erie except the Pennsylvania Ridge and east basin surveys (Tables 4.1.1 – 4.1.6). The east basin appears to be less suitable White Perch habitat following the establishment of Dreissenid Mussels. Seventy five percent (75%) of White Perch were less than age 3 in the west basin, whereas 60 - 65% were less than age 3 in the central and east basin surveys. Lakewide catches of White Bass in 2012 were the highest observed (Table 4.1.7b). White Bass catches were ranked first or second highest in the west and central basin surveys, but were less abundant in Pennsylvania Ridge, the east basin and Walleye Cap Area surveys (Tables 4.1.1-4.1.6). Age 2 White Bass dominated catches in west and west-central basin surveys while young-of-the-year were more prevalent in eastern surveys. Smallmouth Bass are observed primarily in the east and west basin surveys. Smallmouth Bass catch rates in 2012 were weakly moderate in the west basin survey, but relative to the time series, were weaker in the east basin survey (Table 4.1.1, Table 4.1.5). The majority of Smallmouth Bass caught in the west basin survey were young-of-the-year (68%), followed by age 2 (24%). In the east basin survey, the age composition was more diverse, with ages 2, 1 and 7 accounting for 78% of the catch. Lakewide catches of Round Gobies in 2012 were the lowest since 1989 (Table 4.1.7b). Round Gobies first appeared in Partnership surveys in the west-central basin during 1997 (Table 4.1.2). Due to their smaller size and body shape, Round Gobies are particularly not vulnerable to capture in index gill nets. Freshwater Drum abundance indices in 2012 were close to average in the west and central basin surveys, but below the time series means in the Pennsylvania Ridge, east basin and Walleye Cap Area surveys (Tables 4.1.1 – 4.1.6). Burbot catches in 2012 were the lowest observed in Pennsylvania Ridge and east basin surveys (Tables 4.1.4 - 4.1.5). Only one (1) Burbot was present in the 2012 Walleye Cap Area index (Table 4.1.6). Burbot abundance peaked in 1998 and has continued to decline since then due to poor recruitment.

Lake Trout are stocked in Lake Erie by U.S. agencies and OMNR as part of an effort to rehabilitate this native species. Many stocked fish are fin clipped and have coded wire tags implanted in the nares (nostril). In 2012, Lake Trout were caught only in the eastern Partnership surveys (east basin, Pennsylvania Ridge and Walleye Cap Area) primarily in nets fished on bottom in the hypolimnion. In 2012, 108 Lake Trout were caught in monofilament index gill nets, with an additional 3 caught in auxiliary 50 mesh 4 ¾" nets. The 2012 Lake Trout index was the highest observed in the east basin time series (Table 4.1.5) but was near average in Pennsylvania Ridge and Walleye Cap Area surveys (Tables 4.1.4 and 4.1.6). Of the 111 Lake Trout caught in index nets, 110 had fin clips.

Clips included adipose (101), left ventral-adipose (5), left pectoral-right ventral (3), and right ventral (1). Sixty nine (69) coded wire tags were detected, revealing the strains of Lake Trout stocked. The number of Lake Trout by strain in 2012 was Slate Island (49), Lake Champlain (13), Finger Lakes (4), and Apostle Island (3). Among Lake Trout caught in index nets in 2012, two (2) were less than 30 cm in length and these yearlings were Slate Island strain. For all Lake Trout caught in all partnership surveys and gear, the fraction of fish with wounds was 0.04 and the fraction of Lake Trout with scars was 0.07. The wounding rate (wounded Lake Trout per 100 examined) of type A1, A2 or A3 was observed to be 4/94 or (0.04) on adult Lake Trout with total lengths greater than or equal to 532 mm. The fraction of Lake Trout with A1-A3 wounds present by strain was Slate Island (0.04), Lake Champlain (0.08), Finger Lakes (0), Apostle Island (0.33) and unknown (0). The fraction of Lake Trout with scars present by strain was Slate Island (0.06), Lake Champlain (0), Finger Lakes (0), Apostle Island (0.33) and unknown (0.10).

One Lake Sturgeon was caught during 2012 in nets fished at a depth of 10 m on bottom at site 12 (41°48'.78 82°43'.84) in the west basin Partnership survey. The Lake Sturgeon was 851 mm (total length) and weighed 12,679 g. Both Floy and PIT tags were applied by the crew. The left pectoral ray was collected for aging before releasing the Lake Sturgeon alive. Lake Sturgeon in the Great Lakes is currently listed as *Threatened* under the Endangered Species Act of Ontario.

Silver Chub occur throughout Lake Erie, with the greatest densities observed in the west basin (Tables 4.1.1 - 4.1.6). The peak catch of Silver Chub occurred in 1993. Since then, another spike in abundance occurred in 1999, after which catches of Silver Chub declined. In 2013, four (4) Silver Chub were caught lakewide in partnership surveys (Table 4.1.7b). Three (3) Silver Chub were caught in the west basin, while 1 was caught in the west-central basin survey. Lake Erie is in the northern part of the geographic range of Silver Chub. The status of Silver Chub is currently listed as *Threatened* under the Endangered Species Act of Ontario.

Moderate numbers of Rainbow Trout (15) were caught during Partnership index gillnetting in 2012 (Table 4.1.7b). The majority of Rainbow Trout (10) were caught in thermocline gangs which were not included in Tables 4.1.4 to 4.1.5 due to a lack of continuity in fishing this gear over time. One Rainbow Trout was caught in auxiliary index nets fished at a depth of 1 fathom. Four (4) Rainbow Trout were also caught in auxiliary canned 121 mm nets, 3 of which were caught in Pennsylvania Ridge thermocline gangs with one caught in the west-central basin canned at 1 fathom. Rainbow Trout represent the majority of more than 2 million Salmonids stocked annually by Lake Erie agencies. Naturalized populations of Rainbow Trout also occur in Lake Erie.

Although they are no longer stocked in Lake Erie, Coho Salmon (2) were caught during 2012 surveys in nets fished within the thermocline in the east basin (Table 4.1.7b). Three (3) Pink Salmon were caught in index nets during 2012 (Table 4.1.7b). One Pink Salmon was caught at a gear depth of 1 fathom in the west-central basin where water temperatures were cool after fall turnover (16.3 °C); the others were from index nets fished in the Pennsylvania Ridge and east basin surveys within the thermocline at similar temperatures (16.1 °C, 17.0 °C). Pink Salmon were introduced into the Current River, Lake Superior during the 1950s, after which they became established in the Great Lakes (Crawford, 2001). Pink Salmon spawn in tributaries of eastern Lake Erie, maintaining a small population that appears periodically in assessment netting. A 46 cm Sea Lamprey was recovered from bottom nets at site 18 (east), at a depth of 30 m and 10.1 °C. Only a single fish caught in this sample had a Lamprey wound (A1); a 67 cm male Lake Trout.

Biomass trends for dominant species are presented for the west, west-central, east-central and east basins in Figure 4.1.2. Species with average biomass equaling at least 3% of basin averages are represented graphically. Remaining species are presented in the "other" species category. In Lake Erie, the productivity gradient and associated species composition usually decreases from west to east. Since the west basin is considerably smaller in surface area and volume than other basins assessed, absolute numbers and biomass may be comparatively less than the west-central and east-central basins. Trends in mean biomass per gang of all species differed among Lake Erie surveys. West basin species biomass in 2012 (97 kg / gang) was ranked 95th percentile in the time series, well above the average (60 kg / gang). West-central biomass in 2012 (79 kg / gang) was also

above the time series average (56 kg / gang). Similarly, east-central basin biomass (60 kg / gang) was above average (39 kg / gang) while east basin biomass (19 kg / gang) was just below the time series average (20 kg / gang). Mean biomass of all fish species caught was greatest in the west basin, followed by the west-central basin, east-central and east basins. Pennsylvania Ridge, a smaller area represented by 9 sites spanning the habitat transition between central and eastern basins, yielded a mean biomass of 49 kg / gang in 2012 which ranked as 79th percentile in the time series.

The smallest mesh size in the gear is 32 mm which excludes most small bodied forage fishes such as Rainbow Smelt, Emerald Shiners, and juvenile fish of most species. Round Gobies are caught in index gill nets when they are larger, but due to their body shape and benthic behaviour, they are under-represented in gill net assessments and accounted for less than 1% of biomass in all 2012 surveys.

Fish biomass in the 2012 west basin survey decreased 15% from 2011, and consisted of Gizzard Shad (26%), White Bass (20%), Yellow Perch (14%), Walleye (13%), White Perch (11%), Freshwater Drum (8%), Channel Catfish (5%) and other species (3%). White Suckers (1%) and Shorthead Redhorse Suckers (1%) also contributed significantly to biomass in 2012. White Bass biomass was a record high in 2012, representing almost 5 times the White Bass biomass observed in 2011, which was the second highest value in the time series. Smallmouth Bass have historically accounted for more than 1% of all biomass but represented less than 1% in 2012. Alewives were present in 2012 but did not contribute significantly to biomass in the west basin survey.

Total west-central basin biomass in 2012 was 40% higher than 2011. Mean biomass was dominated by Yellow Perch (28%), Gizzard Shad (24%), White Perch (15%), Freshwater Drum (12%), Walleye (12%), and White Bass (6%) with 3% attributed to other species. White Bass biomass in 2012 was also at the highest level in west-central basin surveys, beating the previous high in 2011 by 31%. Alewife represented an average of 3% of total biomass over the time series, but accounted for less than 1% in 2012. White Suckers (2%) and Channel Catfish (1%) comprised the next largest fractions of biomass in 2012.

In the east-central basin survey, mean biomass per gang of all species in 2012 increased by 8 % from 2011. East-central basin biomass in 2012 consisted of White Perch (26%), Gizzard Shad (22%), Yellow Perch (21%), Freshwater Drum (17%), White Bass (7%), Walleye (4%), Alewife (3%) and other species (2%). White Bass biomass dropped 22% from 2011 but was the second highest value in the time series. White Suckers (1%) and Channel Catfish (1%) contributed significantly to east-central biomass in 2012. Alewife biomass in 2012 was more than 70 times greater than 2011 but was 31% below average. This marks a rebound in Lake Erie's Alewife population, almost non-existent since 2003.

In the east basin survey, mean biomass per gang of all species in 2012 increased by 36% from 2011. The species composition of eastern Lake Erie consists of warm, cool, and cold water fish communities. Ten (10) species represented 94% of the fish biomass in 2012 including Yellow Perch (32%), Lake Trout (16%), Gizzard Shad (14%), Walleye (11%), Alewife (8%), Smallmouth Bass (5%), Freshwater Drum (4%), White Perch (2%), White Sucker (1%), and Burbot (1%). Lake Trout biomass in 2012 was the highest in the time series, reflecting the stocking efforts of all agencies. Alewife biomass in 2012 was 32 times the Alewife biomass observed in 2011, exceeding the time series average by 21%. Other species that contributed significantly to east basin biomass included Channel Catfish (2%), White Bass (1%) and Lake Whitefish (1%) with the remaining species accounting for less than 1% of fish biomass caught. Numbers were rounded to the nearest percentage.

Yellow Perch

In 2012, Yellow Perch catch rates (all ages) decreased in the west (23%), and east-central basin (55%) surveys, but increased in the west-central (8%), Pennsylvania Ridge (47%), east basin (61%) and Walleye Cap Area (17%) (Figure 4.1.3). Relative to each time series, 2012 catch rates were

slightly below the mean catch rate in the west (12%), west-central (3%) and east-central basins (8%) but were above average in the Pennsylvania Ridge (90%), east (72%) and Walleye Cap Area (21%) surveys.

Age 2 (2010 year class; 46%) and age 4 (2008 year class; 22%) were the most abundant cohorts in the 2012 west basin survey. In the 2012 west-central basin survey, age 4 (2008 year class 38%) dominated catch rates, followed by age 2 (2010 year class 25%). Similarly, in the east-central basin, age 4 fish represented 32% of Yellow Perch caught, followed by age 2 (22%). An older age composition was observed in the 2012 Pennsylvania Ridge survey, with age 4 (41%), age 5 (20%) and Yellow Perch ages 6 and older (25%) comprising the majority caught. The east basin survey was dominated by age 2 (62%) Yellow Perch followed by yearlings (23%). The age composition observed in the Walleye Cap Area was consistent with the spatially broader east basin 2012 survey. Age 2 (65%) and age 1 (23%) dominated yellow perch catches in the Walleye Cap Area.

Relative to each respective time series, yearling catch rates were low in the west-central, moderate in the west and east-central basins but higher in the east basin, Walleye Cap Area and Pennsylvania Ridge surveys. Abundance indices of Yellow Perch ages 6 and older in 2012 was relatively low in the Walleye Cap Area, moderate in west and east basin surveys, but high in the west-central, east-central and Pennsylvania Ridge surveys. The mean age of Yellow Perch caught reflects differences in age composition between surveys with higher mean ages in the Pennsylvania Ridge and central basin surveys, with lower mean ages in the west and east basin surveys (Figure 4.1.4). Yellow Perch sex ratios remained relatively stable over the time series to 2012, during which females represented 49% to 59% of Yellow Perch ages 2 and older (Figure 4.1.5).

Mean total length (mm) and weight (g) for each sex was plotted by basin for Yellow Perch collected in 2012 with 95% confidence limits to compare with the time series average up to 2011 (Figure 4.1.6). Length and weight of Yellow Perch may be influenced by factors such as temperature, forage abundance, competition, and survival. Mean length at age was close to average with several exceptions. In some cases, mean size of Yellow Perch ages 5 or older in 2012 central and east basin surveys were below the time series means in terms of length, weight or both attributes. Age 2 Yellow Perch caught in the east basin survey in 2012 was above average in length and weight.

Mean length trends at ages 1, 2 and 3 by sex of Yellow Perch caught in surveys are presented in Figure 4.1.7. Oscillations in mean length at age were evident for both sexes. Mean length in 2012 was near average for Yellow Perch ages 1 to 3 in all surveys with the exception of the east basin where age 2 male and female Yellow Perch were larger than average. Yellow Perch length at age in the east basin appears to be larger since the late 1990s compared to the earlier 1989-1993 period (Figure 4.1.7).

During the fall partnership gill net survey in 2012, 26,793 Yellow Perch (3,701 kg) were scanned for PIT tags as sample bags were removed from totes. Some Yellow Perch were not scanned from samples 225 to 255 when the reader was broken. No PIT tags were detected in Yellow Perch scanned in 2012.

Walleye

Walleye catch rates in 2012 dropped from 2011 in the west (62%), east-central (29%), Pennsylvania Ridge (15%), east basin (59%) and Walleye Cap Area (51%) due primarily to fewer yearlings present in 2012 (Figure 4.1.8). In the west-central basin, catch rates increased 67% in 2012, the difference attributed to increases in age 2 and older Walleye. Abundance of all age groups combined was moderate in all basins for each time series, with percentiles ranging from 41 to 64. Indices of Walleye abundance for ages 2 and older were also moderate in all basins during 2012 relative to each time series, with percentiles ranging from 42 to 64.

Yearling Walleye (2011 year class) represented the largest proportion of the catch (55%) in the west basin, followed by age 2 (24%) (Figure 4.1.8). In all other surveys, age 2 (2010 year class) was the most abundant age group, representing from 29% (Pennsylvania Ridge) to 45% (Walleye Cap Area)

of survey catches.

Young-of-the-year (YOY) catch rates were moderate in the west and west-central basin surveys and absent in the Pennsylvania Ridge and east-central basin. In contrast, YOY catch rates were the highest in the east basin and Walleye Cap Area surveys. Age 1 Walleye were absent in the Pennsylvania Ridge and east basin surveys, but yearling abundance was moderate in all other surveys with percentiles ranging from 42 to 64. Age 2 Walleye catch rates in 2012 were moderate in the west basin and Pennsylvania Ridge surveys, were better in the west-central and east-central basins and best in the east basin and Walleye Cap Area surveys. Age 3 catch rates were moderate in all surveys (38-64th percentiles) except for the east-central basin where catch rates in 2012 exceeded 77% of other years. The abundance of the 2008 year class (age 4) was moderate in the west, west-central and east basin surveys but was present at lower densities in the east-central, Pennsylvania Ridge and Walleye Cap Area surveys. Age 5 (2007 year class) Walleye were relatively abundant in the west, west-central and Pennsylvania Ridge surveys, more moderate in the east-central basin, weak in the Walleye Cap Area and absent in the east basin survey. At age 6, the 2006 year class appeared weak in all surveys, but contributed more in the Pennsylvania Ridge and Walleye Cap Area. Walleye ages 7 and older were abundant in all surveys except Pennsylvania Ridge where catch rates were moderate. The 2003 year class (age 9) represented the largest fraction of Walleye ages 7 and older in all basins. Age 9 Walleye accounted for 5% of Walleye caught in the west basin but comprised from 12% to 24% of Walleye caught in other surveys.

The mean age of Walleye caught in 2012 was lowest in the west (2.1), followed by the east-central (3.3) and west-central basins (3.4), the Pennsylvania Ridge (5.8) and east basin (5.9) survey (Figure 4.1.9). Gradual but variable increases in Walleye mean age over the time series were apparent in all surveys except the east basin. This may reflect a combination of increases in survival and decreased recruitment.

The percentage of age 2 and older Walleye caught that were female in 2012 surveys ranged from 48% to 52% in all surveys except the east-central basin survey where females accounted for 77%. In 2012, the proportion of age 2 and older Walleye that were female was slightly below average in the west, west-central basin surveys but more so in the east and Pennsylvania Ridge surveys. In the east-central basin, the fraction that was female exceeded the mean by 21%.

Mean total length (mm) and weight (g) with 95% confidence limits for each sex was plotted by basin for Walleye collected in 2012. The average size at age for each sex across years pooled to 2011 was plotted for comparison (Figure 4.1.11). Both sexes of Walleye were generally above average in length and weight for ages 1 to 5 with some exceptions in the east basin and Pennsylvania Ridge surveys (Figure 4.1.11). Figure 4.1.12 illustrates that in 2012 and recent years, Walleye mean length for ages 1 to 3 were high relative to the time series in the west and central basins combined. Age 2 Walleye were also above the average length for the east basin survey.

Walleye index catch rates were greater in standard canned index nets compared to bottom index gill nets in all basins (Figure 4.1.13). Catch rates in auxiliary index nets fished at 1 fathom (1.8 m) depths in the central basin were 62% higher than standard canned net values in the west-central basin and 45% higher than standard canned nets in the east-central basin. In the east surveys (Pennsylvania Ridge, east basin, Walleye Cap Area), the Walleye catch rate in nets fished within the thermocline (1.7 Walleye / gang) exceeded the catch rate of nets fished on bottom (1.2) and in standard canned nets (1.3).

Walleye catch rates in commercial style 50 mesh 121 mm (4¾") nets fished adjacent to index canned nets were highest in the west-central basin (7.0 Walleye per gang), followed by the west basin (4.3), east-central basin (3.1), nets fished in the thermocline in the eastern surveys (2.1), and in the eastern basin at standard canned depths (1.2) (Figure 4.1.13). Central basin catch rates combined nets fished at standard depths along with canned nets fished at 1 fathom. Total lengths of Walleye caught in index nets ranged from 16 to 76 cm whereas commercial style 4¾" nets caught Walleye 32 cm to 76 cm in length and were generally composed of larger Walleye.

Walleye catch rates in 4¾" (121 mm) nets are presented for the west, west-central, east-central basins pooled (Figure 4.1.14) and for Pennsylvania Ridge, east and Walleye Cap Area surveys combined (Figure 4.1.15). Walleye catch rates in this gear were the highest during the 10 year period since 2003. In eastern surveys combined, 2012 catch rates were in the mid-range of the time series. The 2003 year class was the most abundant older cohort in 2012, representing 34% and 36% of Walleye caught in the west/central (Figure 4.1.14) and east basin (Figure 4.1.15) series respectively.

Walleye (2,675) were scanned for PIT tags in 2012. Some Walleye were not scanned from samples 225 to 255 when the pit scanner was broken. One tagged Walleye was recaptured in the Walleye Cap Area survey in auxiliary 121 mm gear on September 6, 2012. This male Walleye had a PIT and jaw tag indicating that it was tagged April 19, 2005 on Hen Island Shoal by OMNR. When tagged, the age 4 male Walleye was 468 mm (total length) and was age 11 with a total length of 578 mm when caught in the 2012 survey. The Walleye grew 11 cm in length during the 7 years at large.

Lake Whitefish

Lake Whitefish are a migratory cold water species caught typically in central basin surveys following fall turnover and in the hypolimnetic waters of the eastern basin when the water is thermally stratified. The west basin survey occurs in September when the water is warm, preceding the Lake Whitefish migration into the west basin to spawn. Lake Whitefish catch rates in 2012 were lowest or near the lowest of the surveys (Figure 4.1.16). The majority (8) of (14) Whitefish caught in index nets were from the east basin and Walleye Cap Area surveys. Based on a Lake Whitefish index (all ages) consisting of the west-central, east-central, Pennsylvania Ridge, east basin and additional Walleye Cap Area sites, catch rates in 2012 were the same as 2011. Lake Whitefish ages ranged from 3 to 22 in gill net surveys. The 2003 year class (age 9) represented 5/14 Lake Whitefish caught. Other year classes included the 2005 (3), 2002(3), 2001(1), 2009(1) and 1990(1). The increasing mean age in the Lake Whitefish population reflects the continued dominance of the 2003 cohort and minimal recruitment since then (Figure 4.1.17). Whitefish from the 2003 cohort were not fully recruited to the aggregate survey index until age 5 (Figure 4.1.17). Estimated survival from the aggregate whitefish index using a catch curve from ages 5 to 9 was 41%. Mean lengths and weights at age with 95% confidence limits for each sex are presented in Figure 4.1.18. Although sample sizes were small (N=14), mean lengths and weights of Lake Whitefish appeared near average in 2012 surveys.

In auxiliary 121 mm nets fished canned adjacent to index nets, 11 Lake Whitefish were caught in 2012. Catches were in the west-central (7), east-central (3) and east basin (1) surveys. Ten (10) Lake Whitefish were age 9 and one was age 8.

Monofilament – Multifilament Gear Comparison

For the first time in this program, multifilament index gill nets were fished adjacent to Partnership monofilament canned index gill nets at 10 locations to develop methods for standardizing Walleye catches between agency assessment gears. The multifilament nylon nets were 1300 feet in length with mesh sizes ranging from 2 inches to 5 inches in ¼" increments. Unfortunately, a gang of multifilament nets were destroyed at site 8 (west-central) by a vessel. Multifilament gear was fished at site 26 (west-central) to compensate for this lost sample.

An error labeling bags of fish on board occurred at site 18 (west) for catches in monofilament canned nets. Using observations of Walleye counts at the puller, combined with species composition of mesh sizes, some bags of fish labelled as bottom nets at site 11 were corrected to site 18 monofilament canned nets. Staff believed the assumptions were reasonably accurate. A slight loss in the spatial resolution of catches between sites 11, 15, and 18 occurred but arithmetic mean catch rates were unaffected by this error. This multi-gear comparison was considered invalid though, and the gear comparison at site 18 (west) was redone at site 19 (west). Paired samples were successfully fished at 9 sites: W1, W19, W6, WC19, WC26, WC33 and EC24, EC36, EC17 (Figure 4.1.19).

Mean catch per canned gang by gear is presented in Table 4.1.8. Mean catch of all species combined was higher in multifilament nets (127.9) compared to monofilament nets (108). Mean Walleye catch rate in multifilament nets (17.0) was more than double monofilament nets (7.9). Catches of other species were greater in multifilament nets than monofilament gear except for White Perch and Alewife (Table 4.1.8). The length distributions of Walleye in different net types were similar for smaller Walleye, but the multifilament gear caught considerably more large Walleye, likely due to ¼" mesh size increments in multifilament gear compared to ½" increments in monofilament gear for stretched mesh sizes greater than 3 inches (76 mm) (Figure 4.1.20). This is reflected by the age compositions where catches of Walleye ages 2 to 6 were greater in multifilament nets (Figure 4.1.21). More age 9 Walleye were caught in monofilament compared to multifilament gear (4:2).

References

Crawford, S.S. 2001. Salmonine introductions to the Laurentian Great Lakes: an historical review and evaluation of ecological effects. Can.Spec. Publ. Fish. Aquat. Sci. 132. 205 pp.

Table 4.1.1 Total numbers of each species caught during western basin Partnership Index Fishing, Lake Erie, 1990-2012. Numbers are standardized to 44 gangs. Average catch from 1990-2012 is presented for each species.

Species	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	Average
Silver Lamprey	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	1	0	0	0.1
Lake Sturgeon	0	0	1	1	1	1	2	0	1	0	3	0	2	5	8	0	1	9	2	0	2	1	1	1.8
Longnose Gar	0	0	1	0	1	0	0	0	1	7	4	1	0	0	0	0	0	0	0	1	1	0	2	0.8
Alewife	87	2,272	309	196	349	1,384	105	54	1,159	1,239	1,939	154	721	0	103	2	80	1	0	0	0	14	7	442.4
Gizzard Shad	718	7,729	2,856	4,103	5,844	6,624	1,118	1,416	2,873	8,542	2,838	4,056	8,561	7,043	5,294	14,185	8,329	2,887	3,283	1,544	1,846	7,927	7,082	5,073.8
Pink Salmon	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0.0
Chinook Salmon	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0
Rainbow Trout	3	0	0	1	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	0	1	0	0	0.3
Brown Trout	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0
Lake Whitefish	10	1	0	1	0	5	0	0	1	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0.9
Rainbow Smelt	8	1	0	37	0	1	0	1	1	0	1	95	1	0	1	1	2	2	34	1	1	0	2	8.2
Muskellunge	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0
Quillback	0	1	6	3	5	4	12	5	4	12	7	34	24	25	13	12	9	9	11	8	1	12	11	9.9
White Sucker	59	43	130	46	94	46	73	71	30	39	42	101	90	77	127	133	69	61	71	91	29	201	78	78.3
Silver Redhorse	0	0	0	0	0	0	0	0	0	0	5	0	0	0	0	0	0	0	0	0	0	0	0	0.2
Golden Redhorse	0	0	0	0	0	0	0	19	0	1	6	0	0	0	0	0	0	0	0	0	0	0	0	1.1
Shorthead Redhorse	1	4	22	7	15	13	14	50	17	19	23	31	6	28	33	15	10	41	34	84	31	54	37	25.6
Redhorse sp.	0	0	0	0	0	0	0	0	1	0	0	0	19	0	0	0	0	0	0	0	0	0	0	0.9
Goldfish	0	0	0	0	0	1	0	0	0	2	4	0	0	0	0	2	0	0	5	2	0	0	0	0.7
Common Carp	25	29	4	7	3	2	7	3	1	3	16	22	6	1	4	1	8	3	3	5	1	3	9	7.3
Silver Chub	25	35	147	320	59	96	89	73	67	185	133	61	48	44	84	21	38	9	2	1	2	8	3	67.4
Hornyhead Chub	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0
Emerald Shiner	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	1	0	0	0.1
Spottail Shiner	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	0	0	1	0	0	0	0	0	0.3
Brown Bullhead	0	0	1	0	0	0	0	0	0	0	3	1	1	0	0	2	0	1	1	0	0	0	2	0.5
Channel Catfish	62	112	45	83	48	55	59	37	35	62	38	86	89	139	97	244	167	218	106	140	106	268	263	111.3
Stonecat	1	1	0	1	0	0	1	0	2	2	0	0	0	0	0	0	0	1	0	0	0	0	1	0.4
Tadpole Madtom	0	7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3
Brindled Madtom	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0
Burbot	0	0	0	1	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0.1
Trout-perch	0	0	0	0	0	0	0	1	4	0	1	3	0	1	0	0	0	0	0	0	0	0	0	0.4
White Perch	462	713	3,155	2,217	1,194	971	972	382	309	1,795	2,053	1,710	1,195	3,090	2,998	3,613	5,360	3,462	1,852	2,108	973	5,167	2,989	2,119.1
White Bass	158	110	65	67	288	89	135	271	102	174	225	308	460	367	218	285	277	275	357	435	134	804	2,041	332.4
Rock Bass	6	27	20	1	18	5	12	9	8	5	8	23	7	13	8	3	5	21	1	9	10	0	3	9.6
Pumpkinseed	0	0	0	0	0	0	2	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0.2
Bluegill	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0.0
Smallmouth Bass	41	83	149	231	231	108	248	162	166	93	116	12	59	12	17	2	32	15	19	78	17	13	34	84.2
Largemouth Bass	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0.0
Black Crappie	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	2	0	0	0	0	1	0	0.2
Yellow Perch	822	1,324	2,737	2,211	3,291	4,612	5,102	3,468	3,292	4,415	3,445	10,701	5,774	5,565	7,396	6,843	3,616	5,057	8,472	4,981	2,326	5,448	4,360	4,576.4
Walleye	602	1,648	1,356	1,886	1,002	1,503	821	1,148	648	769	1,143	691	714	1,297	1,408	1,365	914	483	837	831	326	2,178	848	1,061.6
Round Goby	0	0	0	0	0	0	0	0	5	3	5	4	4	4	10	2	0	0	12	5	1	1	0	2.4
Freshwater Drum	460	378	377	405	398	308	459	314	238	572	445	873	864	536	578	1,196	433	459	317	407	101	1,019	545	507.9
Goldfish-Carp Hybrid	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	2	0	1	0.2
Total	3,551	14,517	11,383	11,823	12,842	15,829	9,231	7,484	8,965	17,939	12,505	18,958	18,646	18,249	18,407	27,927	19,354	13,016	15,422	10,731	5,914	23,120	18,319	14,525
Number of Sites	21	22	21	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22
Number of Gangs	40	39	40	42	44	44	44	44	44	44	44	44	44	44	44	44	44	44	44	44	44	44	44	43

Note: Values are continually corrected for errors and may be different from previous reports.

Table 4.1.2 Total numbers of each species caught during west-central basin Partnership Index Fishing, Lake Erie, 1990-2012. Numbers are standardized to 72 gangs. Average catch from 1990-2012 is presented for each species. Only standard gear was included.

Species	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	Average
Lake Sturgeon	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0.1
Longnose Gar	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0.1
Alewife	3,113	12,712	1,578	1,746	2,821	3,437	785	27	2,616	5,532	3,082	432	7,928	0	1	0	64	0	0	0	0	0	45	1,996.5
Gizzard Shad	1,011	4,481	1,619	2,575	1,555	2,381	1,814	812	1,873	4,506	6,522	2,496	13,739	2,552	3,053	4,985	2,010	3,165	435	1,492	11,074	2,608	6,981	3,640.8
Coho Salmon	0	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1
Chinook Salmon	0	4	0	1	0	3	0	3	0	0	0	0	1	0	0	0	0	0	0	1	0	0	0	0.6
Rainbow Trout	2	0	1	0	0	2	0	0	0	3	1	0	3	2	0	0	3	1	0	1	0	1	0	0.9
Lake Whitefish	5	0	5	4	10	29	15	62	31	47	49	11	17	36	15	82	40	29	50	21	5	9	1	24.9
Rainbow Smelt	47	386	230	155	332	1,382	435	331	89	336	124	33	85	49	71	251	102	365	560	314	444	315	34	281.3
Quillback	0	0	0	0	0	0	0	0	0	1	0	0	0	1	2	0	1	1	1	0	0	0	0	0.3
White Sucker	71	79	80	9	25	26	25	29	42	19	63	15	29	57	98	60	67	77	64	97	121	26	109	56.0
Spotted Sucker	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0.0
Silver Redhorse	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	0	0	0	0	0	0	0	0	0.2
Golden Redhorse	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0.1
Shorthead Redhorse	1	6	2	0	0	1	1	0	0	4	0	1	0	3	2	0	2	1	5	10	1	4	2	2.0
Goldfish	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0.1
Common Carp	3	0	0	0	0	2	1	1	0	0	2	0	2	1	0	0	3	5	1	0	1	4	0	1.1
Silver Chub	2	5	15	0	0	1	0	0	3	4	3	0	2	0	0	1	0	1	5	3	0	0	1	2.0
Emerald Shiner	0	0	0	0	0	0	1	0	0	0	0	0	1	1	0	0	0	0	0	0	3	0	0	0.3
Spottail Shiner	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0
Brown Bullhead	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0.0
Channel Catfish	17	28	25	15	6	25	27	5	6	3	13	1	9	7	7	11	49	65	13	44	70	63	52	24.4
Stonecat	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0
Burbot	3	7	5	3	5	3	2	8	9	0	2	1	0	4	0	0	0	0	0	0	0	0	0	2.3
Trout-perch	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0
White Perch	3,898	2,055	5,184	2,881	1,141	1,221	552	865	881	2,177	3,431	1,269	2,896	2,978	6,473	6,438	9,077	6,237	6,923	5,880	6,037	5,386	5,080	3,867.8
White Bass	212	184	70	26	347	232	304	678	297	295	481	125	248	217	383	582	654	474	511	367	854	1,072	926	414.3
Rock Bass	0	1	0	0	1	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	1	
Pumpkinseed	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0.0
Bluegill	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0.0
Smallmouth Bass	0	3	2	0	1	1	1	1	0	0	1	0	0	1	0	0	0	1	0	0	1	0	0	0.6
Largemouth Bass	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0.1
Yellow Perch	1,810	2,315	2,105	1,185	2,020	2,260	3,813	5,002	3,070	5,034	11,823	9,604	10,941	12,950	24,743	13,156	11,161	15,409	12,276	9,516	7,616	7,538	8,658	7,999.3
Walleye	479	591	740	483	282	783	527	486	183	98	462	56	197	317	1,765	1,022	629	428	211	318	632	309	512	500.4
Round Goby	0	0	0	0	0	0	0	1	8	37	19	13	10	24	15	9	17	4	49	11	7	8	1	10.1
Freshwater Drum	3,306	1,395	2,696	1,330	1,740	1,192	1,441	1,534	840	1,231	1,752	809	3,249	1,883	1,736	2,076	2,281	1,360	1,475	1,587	1,374	1,238	1,395	1,692.1
Goldfish-Carp Hybrid	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0.1
Total	13,981	24,253	14,357	10,393	10,286	12,983	9,744	9,845	9,939	19,330	27,834	14,866	39,359	21,084	38,366	28,676	26,161	27,624	22,579	19,664	28,240	18,582	23,800	20,519
Number of Sites	34	36	36	36	36	36	36	35	28	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36
Number of Gangs	68	72	72	72	72	72	72	72	56	72	72	72	72	72	72	72	72	72	72	72	72	72	72	71

Note: Values are continually corrected for errors and may be different from previous reports.

Table 4.1.3 Total numbers of each species caught during east-central basin Partnership Index Fishing, Lake Erie, 1989-2012. Numbers are standardized to an effort of 72 gangs. Average catch from 1989-2012 presented for each species. Study was not done in 1996. Only standard gear was included.

Species	1989	1990	1991	1992	1993	1994	1995	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	Average
Lake Sturgeon	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0
Alewife	677	3,567	12,878	1,894	682	578	1,556	143	1,350	7,108	5,033	793	8,380	4	4	48	153	18	4	0	1	35	1,058	1,998.4
Gizzard Shad	860	285	2,633	522	1,003	637	1,971	426	1,250	3,197	2,281	462	5,753	127	351	1,822	892	608	53	247	503	520	5,788	1,399.6
Coho Salmon	1	2	0	0	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0.2
Chinook Salmon	0	0	0	0	0	2	0	9	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0.6
Rainbow Trout	3	0	1	2	1	0	2	2	1	1	0	2	0	1	0	0	1	0	1	1	0	0	0	0.8
Lake Trout	1	0	1	2	0	2	0	0	1	0	0	0	0	0	0	0	1	0	0	0	0	2	0	0.5
Lake Whitefish	5	2	2	4	41	21	24	142	46	33	21	11	21	27	14	43	36	13	6	13	9	2	1	23.3
Rainbow Smelt	320	118	525	322	375	324	1,418	309	1,329	589	248	1,450	920	307	835	423	438	758	1,083	1,088	142	834	191	623.7
Northern Pike	0	12	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.5
Quillback	0	0	0	0	24	9	3	0	1	0	5	0	0	0	2	2	0	0	0	1	0	5	0	2.2
White Sucker	72	52	63	72	129	78	126	46	60	56	71	30	135	13	60	78	83	35	35	73	52	62	30	65.7
Silver Redhorse	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0.0
Golden Redhorse	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	1	0	0	0.2
Shorthead Redhorse	0	15	0	4	12	0	2	2	1	2	18	0	1	0	0	0	1	1	1	3	1	3	0	2.9
Goldfish	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0.1
Lake Chub	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1
Common Carp	0	0	0	1	5	0	0	0	1	0	7	4	0	0	0	1	0	0	0	0	0	0	0	0.8
Silver Chub	0	0	0	1	0	0	0	0	24	14	18	7	2	0	1	4	2	2	0	2	0	2	0	3.4
Emerald Shiner	0	0	0	0	15	2	5	0	0	0	0	0	0	2	2	0	1	0	2	4	0	0	2	1.5
Common Shiner	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0.1
Spottail Shiner	0	2	1	1	3	0	0	2	0	18	0	0	10	0	2	0	2	0	0	0	2	0	0	1.9
Notropis sp.	9	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.5
Channel Catfish	12	3	11	10	43	19	12	7	6	6	26	9	23	2	17	8	11	18	0	8	8	12	19	12.6
Stonecat	0	0	0	0	0	2	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1
Tadpole Madtom	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1
Burbot	31	13	9	19	20	19	14	25	36	15	2	12	9	0	1	3	2	1	2	0	2	1	0	10.3
Trout-perch	0	7	1	19	12	4	0	2	2	1	0	15	4	12	7	1	3	0	4	0	0	0	0	4.1
White Perch	7,621	4,449	1,929	3,480	809	392	203	268	179	529	1,086	1,225	4,046	1,967	1,777	6,905	3,674	2,364	2,688	1,713	2,440	3,009	6,230	2,564.5
White Bass	636	88	170	91	67	203	176	734	167	419	316	101	261	276	232	329	765	330	161	201	143	1,451	952	359.5
Rock Bass	0	0	0	0	3	0	3	0	0	0	0	0	0	1	0	0	0	0	0	1	0	1	0	0.4
Bluegill	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	0	0.1
Smallmouth Bass	0	0	0	0	0	0	8	0	6	2	0	0	1	0	0	1	0	0	0	2	0	0	0	0.8
Largemouth Bass	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0.0
Yellow Perch	3,332	1,121	1,174	1,295	726	2,179	1,944	4,681	2,347	7,149	9,229	4,613	8,458	5,744	6,956	8,578	8,132	9,367	9,967	12,384	7,153	12,186	5,732	5,845.5
Walleye	465	118	207	276	367	366	237	82	70	17	29	27	99	68	639	473	310	63	45	91	33	152	108	188.4
Round Goby	0	0	0	0	0	0	0	0	2	40	61	34	157	76	70	148	39	41	41	34	91	68	22	40.2
Freshwater Drum	3,612	2,443	1,876	2,380	1,323	1,184	548	956	669	985	1,304	1,304	2,399	1,077	1,890	1,123	1,227	670	799	1,156	311	907	1,575	1,379.0
Total	17,659	12,296	21,482	10,398	5,662	6,023	8,247	7,836	7,549	20,181	19,758	10,099	30,682	9,706	12,860	19,992	15,774	14,290	14,892	17,012	10,892	19,253	21,708	14,533
Number of Sites	27	22	31	30	29	17	24	33	32	36	36	36	36	36	36	36	36	36	36	36	36	36	36	33
Number of Gangs	54	44	62	60	58	34	48	66	64	72	72	72	72	72	72	72	72	72	72	72	72	72	72	65

Note: Values are continually corrected for errors and may be different from previous reports.

Table 4.1.4 Total numbers of each species caught during Pennsylvania Ridge Partnership Index Fishing, Lake Erie, 1991-2012. Numbers are standardized to an effort of 18 gangs. Average catch from 1991-2012 is presented for each species. The study was not done in 1996 and 1997. Only standard canned nets are included (no thermocline gangs).

Species	1991	1992	1993	1994	1995	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	Average
Longnose Gar	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0.1
Alewife	740	1,530	0	16	133	605	69	2,284	42	1,076	0	0	0	489	0	0	0	11	2	263	363.0
Gizzard Shad	16	20	36	531	95	96	101	515	141	374	15	17	2	163	20	85	48	98	306	246	146.3
Pink Salmon	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1
Coho Salmon	2	0	2	0	0	0	1	0	2	0	1	0	0	0	0	1	0	0	1	0	0.5
Chinook Salmon	0	0	0	1	0	0	2	0	0	1	0	0	0	0	0	0	0	0	0	0	0.2
Rainbow Trout	1	0	2	0	1	2	5	3	8	17	7	13	35	8	0	1	1	1	4	3	5.6
Lake Trout	1	2	8	5	9	3	2	0	5	4	1	10	3	4	2	1	2	3	5	4	3.7
Lake Whitefish	13	17	33	15	53	59	1	1	14	1	9	3	12	1	115	43	11	0	0	2	20.1
Rainbow Smelt	179	22	38	38	60	40	14	8	111	21	54	80	9	16	630	183	86	6	10	489	104.7
Muskellunge	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0.1
Quillback	0	0	0	0	0	0	1	2	6	1	0	2	0	2	0	1	2	0	12	0	1.5
White Sucker	18	20	12	15	15	62	11	9	65	10	24	16	13	19	7	12	72	40	37	15	24.6
Silver Redhorse	0	0	0	0	0	2	0	0	0	1	0	0	0	0	0	0	0	0	3	1	0.4
Golden Redhorse	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0.1
Shorthead Redhorse	0	3	3	1	2	24	2	2	18	2	3	9	0	3	0	6	44	2	50	0	8.7
Redhorse sp.	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0.1
Common Carp	0	0	0	0	0	0	0	3	1	0	0	1	0	0	0	0	0	0	0	0	0.3
Silver Chub	0	0	0	0	0	0	0	0	3	0	8	0	0	1	0	2	2	0	1	0	0.9
Emerald Shiner	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	1	0	0.2
Spottail Shiner	0	3	0	0	0	0	0	0	0	0	0	3	0	1	0	0	0	0	2	0	0.5
Channel Catfish	0	4	2	3	0	4	2	1	5	2	0	1	0	1	2	1	1	0	10	1	2.0
Stonecat	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1
Burbot	8	8	8	12	15	71	59	36	74	49	76	49	10	10	54	17	20	8	14	6	30.2
Trout-perch	0	0	0	0	0	0	0	1	4	2	1	0	0	0	2	0	0	0	0	0	0.5
White Perch	446	195	93	34	46	70	56	68	142	104	129	34	39	186	16	73	44	436	425	58	134.7
White Bass	55	63	7	4	84	35	20	36	26	5	6	5	3	103	20	34	18	21	106	9	33.0
Rock Bass	1	1	0	1	1	13	7	2	9	1	0	0	0	2	0	1	0	2	3	0	2.2
Smallmouth Bass	0	0	0	0	1	2	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0.3
Black Crappie	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0.1
Yellow Perch	714	20	190	104	483	1,743	1,654	3,752	1,881	3,008	1,115	1,310	2,558	4,710	4,280	3,508	3,783	5,204	2,853	4,395	2,363.2
Walleye	13	34	23	27	47	19	12	7	13	7	14	9	102	30	7	39	31	18	20	17	24.4
Round Goby	0	0	0	0	0	0	2	19	30	38	37	4	9	146	95	67	28	25	22	3	26.2
Freshwater Drum	285	118	43	142	88	103	41	62	74	56	39	15	9	21	14	37	127	56	98	3	71.5
Total	2,493	2,060	501	949	1,134	2,953	2,062	6,813	2,679	4,782	1,540	1,581	2,804	5,917	5,263	4,112	4,321	5,931	3,985	5,515	3,370
Number of Sites	9	9	9	9	9	9	9	9	9	9	9	9	9	9	4	9	9	9	9	9	9
Number of Gangs	18	18	18	18	18	18	18	18	18	18	18	18	18	18	8	18	18	18	18	18	18

Note: Values are continually corrected for errors and may be different from previous reports.

Table 4.1.5 Total numbers for each species caught during eastern basin Partnership Index Fishing surveys, Lake Erie, 1989-2012. Numbers are standardized to an effort of 60 gangs. Average catch from 1989-2012 presented for each species. Study was not done in 1996 and 1997. Low sample size in 1995 limits the value of information. Only standard gear included Thermocline gangs and 2 m above thermocline sets were excluded.

Species	1989	1990	1991	1992	1993	1994	1995	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	Average
Sea Lamprey	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0.0
Longnose Gar	1	0	0	0	0	0	0	1	2	0	0	0	1	0	0	0	0	0	0	0	0	0	0.2
Alewife	2,257	111	1,628	1,248	193	118	1,046	1,697	599	2,296	29	2,597	2	12	14	1,214	7	3	2	102	15	701	722.3
Gizzard Shad	325	75	73	18	76	52	266	382	335	514	190	1,001	99	14	714	845	36	111	151	490	90	409	284.8
Pink Salmon	0	0	4	2	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	1	0	0	0.4
Coho Salmon	0	0	4	2	2	0	0	0	1	0	2	1	0	0	1	1	0	0	1	0	0	0	0.6
Chinook Salmon	0	0	0	0	0	0	0	0	0	0	1	1	0	0	1	0	0	0	0	0	1	0	0.2
Rainbow Trout	1	3	5	8	0	2	4	6	2	0	4	6	6	1	15	1	1	2	7	4	1	1	3.6
Brown Trout	1	0	0	0	0	0	0	3	0	0	0	21	2	2	1	0	0	0	1	0	3	0	1.6
Lake Trout	15	5	8	3	26	24	4	11	11	18	9	15	30	8	18	24	21	15	17	58	57	95	22.3
Lake Whitefish	15	43	35	14	0	10	8	133	6	0	2	18	2	2	3	45	16	39	4	45	0	4	20.0
Cisco	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1
Rainbow Smelt	669	577	94	26	2	81	79	5	13	32	58	223	61	220	128	88	179	365	643	148	68	229	181.2
Northern Pike	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1
Mooneye	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1
Quillback	4	0	0	0	0	5	0	0	2	4	3	0	1	0	0	4	4	0	3	2	0	4	1.6
White Sucker	260	168	88	57	148	63	26	66	116	107	122	152	54	26	35	107	39	45	87	32	66	30	86.0
Silver Redhorse	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0.0
Golden Redhorse	0	0	0	0	0	0	0	0	1	6	4	0	0	0	0	0	0	0	0	0	0	0	0.5
Shorthead Redhorse	40	99	16	44	86	17	8	21	18	47	39	5	20	6	1	4	39	0	5	6	0	6	23.9
Redhorse sp.	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0	1	0	0	0	0.2
Common Carp	22	3	0	2	0	0	4	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	1.5
Silver Chub	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0.0
Emerald Shiner	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0.0
Brown Bullhead	0	1	0	0	0	2	0	0	2	0	1	0	0	0	0	0	0	0	0	0	0	1	0.3
Channel Catfish	5	3	0	2	2	0	4	7	6	7	28	3	2	7	3	6	14	10	26	3	3	20	7.3
Stonecat	12	3	6	3	7	0	0	0	10	2	3	0	0	0	0	0	0	0	0	1	0	0	2.1
Burbot	5	11	20	11	29	49	53	238	185	212	108	143	171	113	101	31	64	25	24	9	21	5	74.0
Trout-perch	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	2	0	0	1	0.2
White Perch	3,339	1,421	481	129	104	36	56	22	49	35	76	181	19	10	45	1,117	117	224	123	262	183	200	374.1
White Bass	174	28	187	23	15	10	64	34	24	61	19	45	8	6	23	172	60	45	49	23	128	31	55.8
Rock Bass	209	76	30	96	152	122	71	56	299	480	109	11	20	43	7	14	117	7	64	41	2	28	93.4
Pumpkinseed	0	1	0	0	11	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1	0	0	0.7
Bluegill	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0.1
Smallmouth Bass	137	333	64	239	300	370	270	284	242	890	341	111	156	195	150	413	854	298	201	166	48	109	280.4
Largemouth Bass	0	0	0	0	0	0	0	0	0	1	0	0	3	0	0	0	0	0	0	0	0	0	0.2
Black Crappie	6	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4
Yellow Perch	1,180	464	382	228	135	47	146	211	679	1,306	3,160	1,321	3,608	1,983	1,643	4,650	3,796	2,936	3,948	5,524	2,131	3,085	1,934.7
Walleye	140	79	31	57	63	46	34	29	41	62	41	42	31	38	345	109	199	98	162	65	173	70	
Round Goby	0	0	0	0	0	0	0	0	0	9	19	178	93	54	23	55	27	25	26	45	11	44	27.7
Freshwater Drum	1,063	335	178	207	404	172	266	374	142	145	303	151	183	257	319	343	74	168	270	162	173	69	261.7
Total	9,879	3,840	3,332	2,415	1,753	1,225	2,408	3,580	2,786	6,233	4,674	6,229	4,575	2,999	3,590	9,243	4,417	4,417	5,818	7,191	3,175	5,143	4,464
Number of Sites	27	26	26	20	19	19	8	30	30	29	30	30	30	30	30	30	21	30	30	29	30	30	27
Number of Gangs	49	45	52	40	37	38	16	60	60	58	60	60	60	60	60	60	42	60	60	58	60	60	53

Note: Values are continually corrected for errors and may be different from previous reports.

Table 4.1.6 Total numbers of each species caught during the Partnership Index Fishing survey in the Walleye Cap Area, eastern Lake Erie, 2000-2012. Thermocline samples were included in years fished. Numbers of sites and gangs (samples) are presented. The number of sites was reduced to 9 in 2007. No thermocline gangs were fished in 2007. All catches are standardized to 51[a] gangs. Catches from the east basin survey sites within the Walleye Cap Area are included in this table. Tables 4.1.5 and 4.1.6 are not mutually exclusive.

Species	2000	2001[a]	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	Average
Sea Lamprey	0	0	0	0	0	0	0	0	0	0	1	1	1	0.2
Alewife	1,358	42	1,481	3	10	17	68	0	5	5	63	29	436	270.4
Gizzard Shad	49	218	147	33	4	344	40	57	82	62	31	52	366	114.2
Pink Salmon	0	0	0	0	0	0	0	0	0	0	1	0	0	0.1
Coho Salmon	1	0	5	0	0	1	0	0	0	1	0	0	0	0 6
Chinook Salmon	0	0	1	0	0	1	0	0	0	0	2	0	0	0.3
Rainbow Trout	9	12	47	19	4	21	1	0	6	6	27	11	2	12.7
Brown Trout	0	0	2	0	1	2	0	0	2	2	1	1	0	0.9
Lake Trout	12	33	10	14	15	13	36	23	7	20	12	59	11	20.4
Lake Whitefish	1	1	1	8	1	14	83	17	36	51	49	0	8	20.8
Rainbow Smelt	55	24	10	12	155	33	56	122	188	437	135	181	207	124 1
Quillback	5	1	1	0	0	0	0	9	1	3	0	0	5	1.9
White Sucker	100	72	30	33	31	80	97	40	27	106	88	193	19	70.3
Golden Redhorse	10	1	0	0	0	0	0	0	0	0	0	0	0	0 9
Shorthead Redhorse	43	19	12	12	2	2	1	71	2	5	6	0	6	13.9
Redhorse sp.	0	0	0	0	0	0	0	0	0	1	0	0	0	0.1
Common Carp	0	1	0	0	0	0	0	0	0	0	0	0	0	0.1
Emerald Shiner	0	0	0	0	0	0	0	0	0	0	0	3	0	0.2
Channel Catfish	9	20	3	6	9	10	1	14	5	28	3	3	20	10.0
Stonecat	0	1	0	0	0	0	0	0	0	0	1	0	0	0 1
Burbot	121	54	69	110	28	76	79	17	13	8	0	16	1	45 7
Trout-perch	0	0	0	0	0	0	0	0	1	1	1	2	1	0.5
White Perch	39	109	51	22	7	85	462	153	243	133	79	689	243	178.0
White Bass	33	48	28	15	10	43	94	65	26	45	7	203	20	48.8
Rock Bass	366	100	16	5	11	26	3	221	5	67	33	1	24	67.5
Pumpkinseed	1	0	0	0	0	0	0	0	0	0	1	0	0	0.2
Smallmouth Bass	567	287	114	135	158	304	32	989	131	201	69	22	69	236.8
Largemouth Bass	0	0	0	0	1	0	0	0	0	0	0	0	0	0.1
Yellow Perch	3,200	1,493	521	2,003	388	1,983	2,762	4,698	4,126	5,282	3,127	2,345	2,484	2,647.1
Walleye	78	96	81	71	117	611	159	272	103	189	62	217	109	166.5
Round Goby	1	1	12	17	38	11	14	6	13	111	19	36	52	25.4
Freshwater Drum	157	237	101	128	167	139	13	99	114	293	97	280	74	146.0
Total	27,736	21,272	14,692	19,343	13,109	25,336	22,428	85,378	22,642	37,981	16,202	25,316	25,316	27,442
Number of Sites	20	21	20	20	20	20	20	9	20	21	21	20	21	19
Thermocline Gangs	10	12	17	15	12	3	9	-	10	7	8	10	7	9
Number of Gangs	50	54	57	55	52	43	49	18	50	49	50	50	49	48

Note: Values are continually corrected for errors and may be different from previous reports.
[a] catch values were standardized to the average number of gangs fished (51) excluding 2007 for comparisons between years.

Table 4.1.7a Observed total numbers of each species caught fishing monofilament index gill nets in all basins during Partnership Index Fishing surveys, Lake Ene, 1989-1999.

Species	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
Silver Lamprey											
Sea Lamprey											
Lake Sturgeon				1	1	1	1	2	1	2	
Longnose Gar	1			1		1				2	9
Alewife	2,498	5,322	27,914	5,799	2,601	3,534	6,270	890	212	6,696	15,805
Gizzard Shad	945	1,871	13,502	4,682	7,382	8,264	10,485	2,932	2,618	5,919	16,717
Pink Salmon			4	1	1						1
Coho Salmon	8	1	6	1	4						7
Chinook Salmon			4	1	1	2	3		11	1	2
Rainbow Trout	4	7	6	8	4	1	5		2	9	101
Atlantic Salmon											
Brown Trout	1			1						3	
Lake Trout	14	7	9	6	24	21	10			15	13
Lake Whitefish	21	47	46	34	71	41	105	15	192	258	89
Cisco		1	-	-	-	-	-	-	-	-	-
Rainbow Smelt	1,005	1,027	1,099	537	531	574	2,409	435	615	1,296	1,021
Northern Pike		8	1								
Muskellunge							1				
Mooneye				1							
Quillback	3	-	1	5	22	12	6	12	5	5	16
White Sucker	271	284	264	316	260	211	178	98	142	244	261
Spotted Sucker											
Silver Redhorse										2	
Golden Redhorse									19		2
Shorthead Redhorse	33	86	23	57	73	27	19	15	52	63	45
Redhorse sp.										1	
Goldfish							2				2
Lake Chub				2							
Common Carp	18	28	25	6	11	3	5	8	4	2	4
Silver Chub		25	35	150	305	59	97	69	73	90	203
Hornyhead Chub		1									
Emerald Shiner					12	1	3	1			
Common Shiner											
Spottail Shiner		1	1	4	2				2		19
Notropis sp.	7		2								
Brown Bullhead		1	-	1	-	1					2
Channel Catfish	13	76	134	79	132	66	89	66	48	56	79
Stonecat	10	4	6	2	5	1	1	1		3	12
Tadpole Madtom			6	1							
Brindled Madtom						1					
Burbot	47	25	40	36	46	57	41	2	31	348	266
Trout-perch	2	4	1	16	10	2	1	-	3	6	1
White Perch	9,084	8,138	5,195	11,233	5,806	2,577	2,388	1,524	1,493	1,245	4,613
White Bass	710	483	642	283	160	741	539	439	1,622	542	941
Rock Bass	171	63	51	83	97	97	27	12	9	77	323
Pumpkinseed		1			7			2			
Bluegill											
Smallmouth Bass	112	288	130	296	405	466	187	249	163	457	338
Largemouth Bass		1									
Black Crappie	5	-				1					
Yellow Perch	3,749	3,694	5,514	5,844	4,133	6,474	8,690	8,915	12,761	9,720	19,361
Walleye	519	1,166	2,232	2,275	2,641	1,513	2,500	1,348	1,709	900	990
Round Goby									1	13	82
Freshwater Drum	3,809	5,442	3,775	5,278	3,075	2,948	2,024	1,900	2,724	1,963	3,090
Goldfish-Carp Hybrid	-	-	-	-	-	-	-	-	-	-	-
Total Number of Fish	23,060	28,104	60,668	37,040	27,822	27,697	36,086	18,975	24,512	29,938	64,415
Sites	60	107	124	116	115	103	99	58	91	121	133
Canned Gangs	54	98	118	114	112	103	99	58	91	121	133
Bottom Gangs	60	107	124	116	115	103	99	58	91	121	133
Thermocline Gangs	10	4	0	0	0	0	0	0	0	0	25
Aux Central 1 fa Canned Gangs	0	0	0	0	0	0	0	0	0	0	0
2 m Above Thermocline Gangs	0	0	0	0	0	0	0	0	0	0	25
Total Gangs	124	209	242	230	227	206	198	116	182	242	316

Table 4.1.7b Observed total numbers of each species caught fishing monofilament index gill nets in all basins during Partnership Index Fishing surverys, Lake Erie, 2000-2012.

Species	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
Silver Lamprey		1			1						1		
Sea Lamprey								-			1	1	1
Lake Sturgeon	3		2	5	8	1	1	10	2		2	2	1
Longnose Gar	4	1	-	1	-		1	-		1	2	-	4
Alewife	16,499	1,477	25,749	9	127	81	2,482	34	13	5	199	135	2,954
Gizzard Shad	12,686	7,520	29,523	9,866	9,131	22,246	12,510	7,790	4,211	3,685	16,607	12,524	23,350
Pink Salmon					1					1	2		3
Coho Salmon	3	5	9	1		1	1		1	1		1	2
Chinook Salmon	1	1	4		1	2				1	2	1	
Rainbow Trout	65	60	96	49	22	111	58	4	14	42	39	34	15
Atlantic Salmon						1							
Brown Trout	1	1	23	2	3	3			2	4	1	5	
Lake Trout	21	43	23	38	32	23	44	16	23	39	68	115	108
Lake Whitefish	74	39	58	82	35	153	168	104	170	99	85	11	14
Cisco	-	-	-	-	-	-	-	-	-	-	-	-	-
Rainbow Smelt	483	1,770	1,262	469	1,629	910	745	1,688	2,556	2,766	1,023	1,464	1,184
Northern Pike													
Muskellunge										1			
Mooneye				-			-	-	-				
Quillback	19	43	26	27	19	14	16	13	14	14	3	29	16
White Sucker	324	356	439	255	354	380	368	203	228	453	343	539	268
Spotted Sucker	1												
Silver Redhorse	5		2		5							3	1
Golden Redhorse	23	6									1		
Shorthead Redhorse	116	90	22	55	51	17	20	70	48	146	41	111	45
Redhorse sp	-		25							1			
Goldfish	4					6			5	2			
Lake Chub	-												
Common Carp	28	28	8	2	5	2	11	6	4	5	2	7	9
Silver Chub	154	72	52	52	85	26	41	12	9	8	2	11	4
Hornyhead Chub													
Emerald Shiner	1		1	4	3		3		2	5	5	4	3
Common Shiner				2									
Spottail Shiner			10		10		3	1			2	2	
Notropis sp													
Brown Bullhead	4	2	1	-	-	2	-	1	1	-	-	-	3
Channel Catfish	88	129	126	156	131	271	234	313	131	221	190	356	357
Stonecat	2	3	-					1			1		1
Tadpole Madtom			-										
Brindled Madtom	-	-	-	-	-	-	-	-	-				
Burbot	277	222	223	284	176	148	105	70	56	54	19	48	12
Trout-perch	2	22	5	14	7	1	3	1	5	2	1	2	1
White Perch	6,684	4,489	8,472	8,212	11,504	17,150	19,774	12,452	11,996	9,940	10,212	14,762	14,622
White Bass	1,135	617	1,035	889	1,287	1,362	2,668	1,762	1,339	1,291	1,448	4,080	4,792
Rock Bass	553	174	30	39	51	31	21	103	11	76	54	6	32
Pumpkinseed	1	1			3		1				1		
Bluegill	-	-	-	3	-	-	1	-	1	-	-	2	-
Smallmouth Bass	1,100	442	234	267	232	320	445	614	332	289	178	64	143
Largemouth Bass	1			4	1			2				1	
Black Crappie	1	-			1		2					1	
Yellow Perch	31,933	31,305	30,226	30,870	42,626	33,730	32,913	34,412	40,323	37,662	28,524	30,750	26,779
Walleye	1,745	909	1,118	1,804	4,469	4,052	2,316	1,303	1,443	1,743	1,429	3,168	1,842
Round Goby	113	101	399	247	161	196	260	106	200	205	173	140	81
Freshwater Drum	3,841	3,509	6,804	3,800	4,631	4,789	4,315	2,554	2,858	3,610	2,038	3,562	3,613
Goldfish-Carp Hybrid								1	1	2	2		1
Total Number of Fish	77,995	53,438	106,009	57,528	76,802	86,029	79,530	63,688	65,999	62,374	62,701	71,941	80,261
Sites	142	142	144	144	143	144	140	119	143	143	141	144	142
Canned Gangs	142	142	144	144	143	144	140	119	143	143	141	144	142
Bottom Gangs	142	142	144	144	143	144	140	119	143	143	141	144	142
Thermocline Gangs	23	26	34	29	26	13	20	0	26	24	19	24	21
Aux Central 1 fa Canned Gangs	0	0	0	0	24	24	24	24	25	24	24	24	24
2 m Above Thermocline Gangs	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Gangs	307	310	322	317	336	325	324	262	337	334	325	336	329

Table 4.1.8 Mean catch per gang by gear type for species caught in the monofilament - multifilament index gill net comparison in 2012.

Species	Monofilament	Multifilament
Gizzard Shad	50.78	59.56
White Bass	22.89	28.67
White Perch	22.00	16.56
Walleye	7.89	17.00
Alewife	3.44	1.67
Rainbow Smelt	0.44	2.00
Yellow Perch	0.44	1.56
Freshwater Drum	0.11	0.44
Largemouth Bass		0.22
White Sucker		0.11
Channel Catfish		0.11
All Species	108.00	127.89
Gangs	9	9

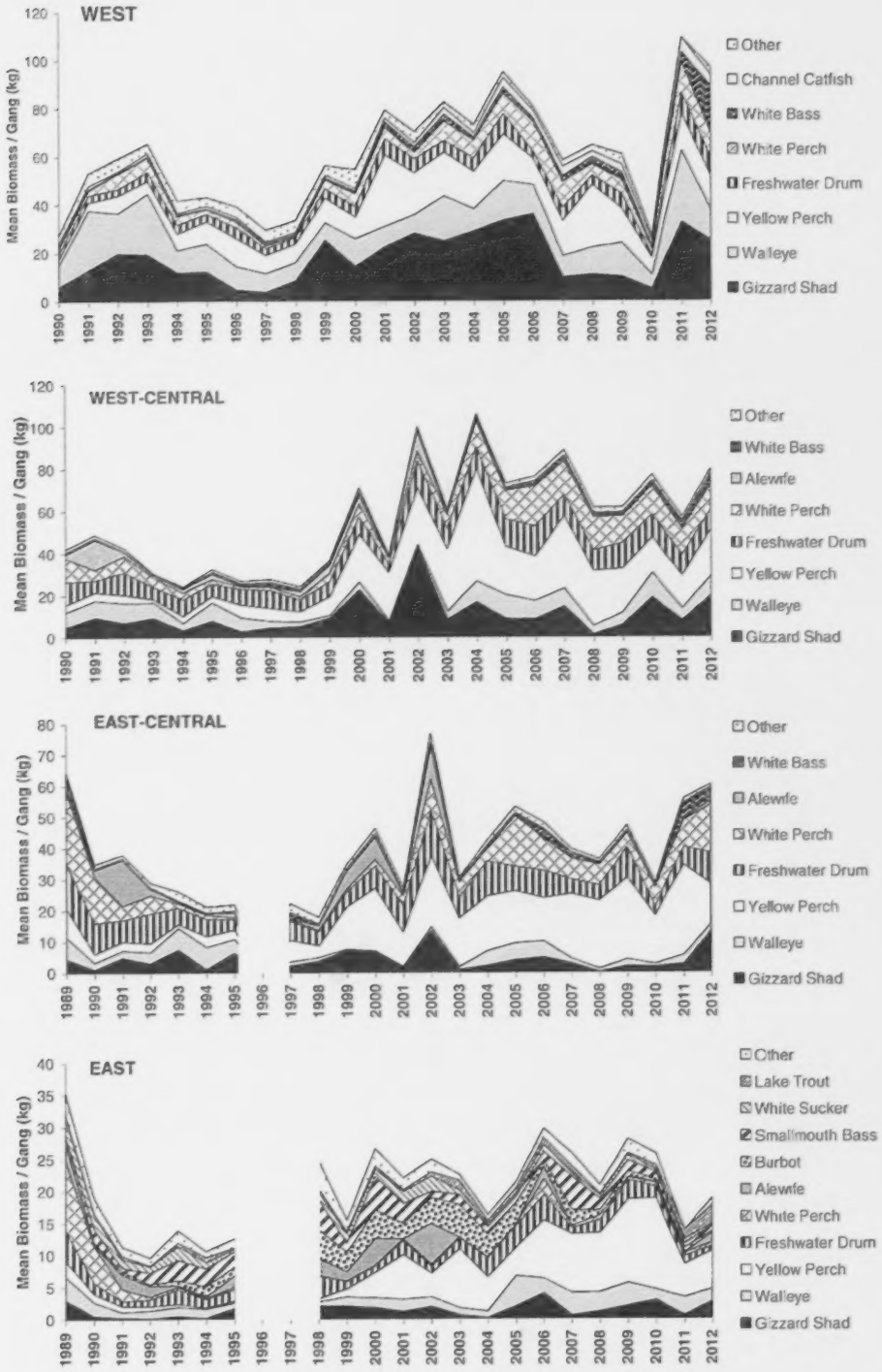

Figure 4.1.2 Mean species biomass (kg / gang) by basin, Partnership Index Fishing, 1989-2012. Species with an average biomass representing less than 3% of the average of all species combined were included in "Other" group[1]. Thermocline gangs (1989, 1990, 1999-2012) were included for the east basin. Studies were not done in the east-central basin in 1996 or in the east basin from 1996-1997. Axes differ between basins. Effort was standardized across mesh sizes.

[1]Alewife were retained in the individual series to illustrate continued absence or recovery.

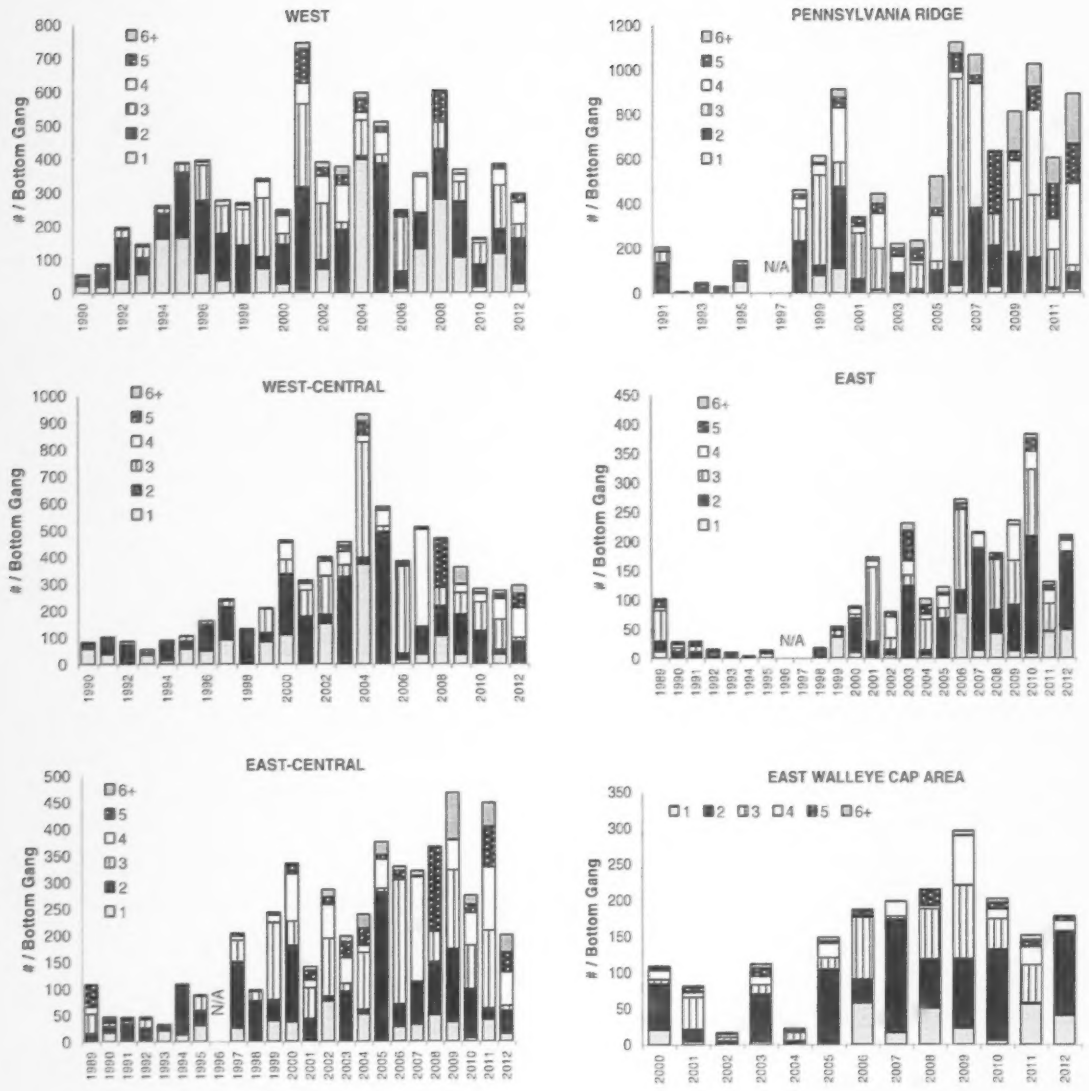

Figure 4.1.3 Yellow Perch catch at age (number) per bottom gang of Partnership Index Fishing gill nets, by basin. Time frames and axes differ among basins. Absent bars indicate when studies were not done. Ages 6 and older pooled. East basin, eastern Walleye Cap Area and Pennsylvania Ridge analyses include depths 30 m or less. East Walleye Cap Area survey and east basin survey are not mutually exclusive. 1995 east basin survey had low sample size.

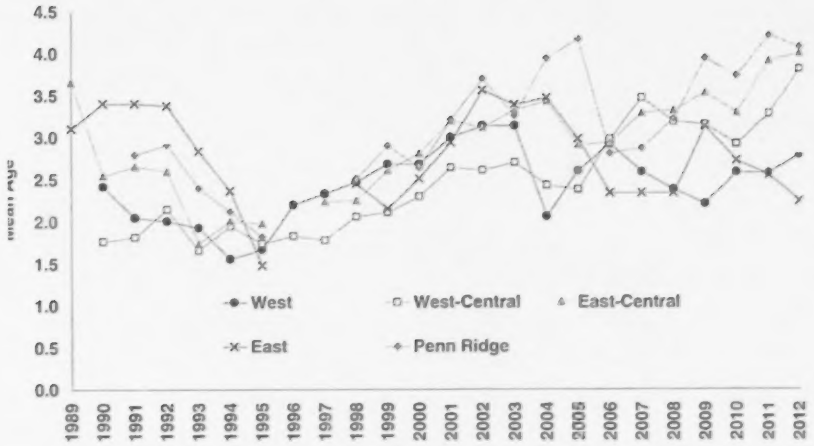

Figure 4.1.4 Mean age of Yellow Perch caught in Partnership Index Fishing gill nets by basin, 1989-2012. All age groups included in calculations. Ages based on scales and otoliths since 2005.

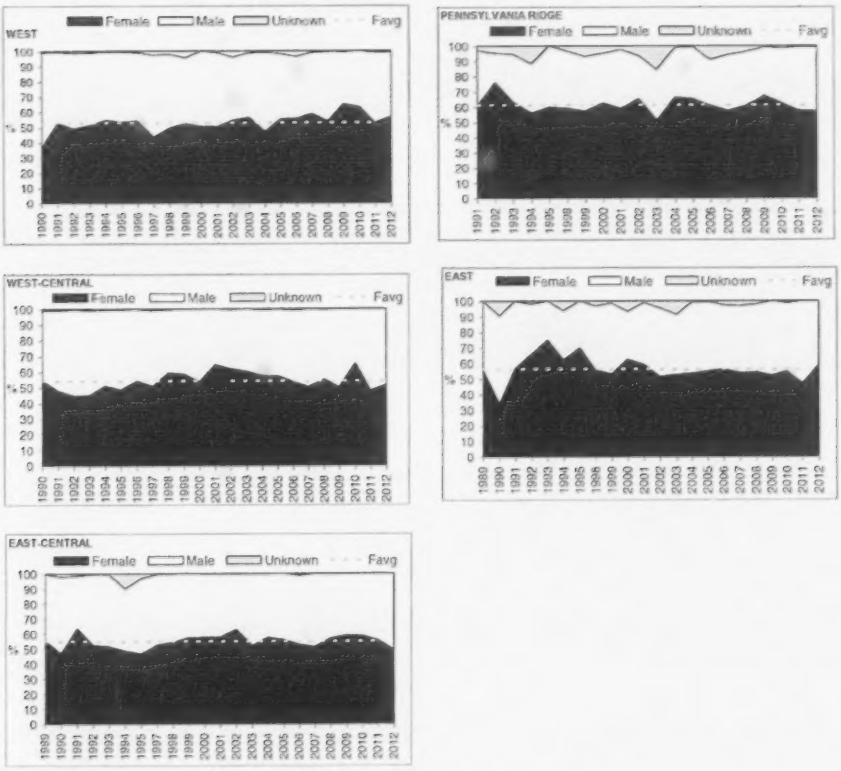

Figure 4.1.5 Proportion of Yellow Perch ages 2 and older represented by each sex caught in fall. Partnership Index Fishing gill nets, 1989-2012. Note absent years in east-central, Pennsylvania Ridge, and east basin time series. Dashed line represents average proportion of females over the time series.

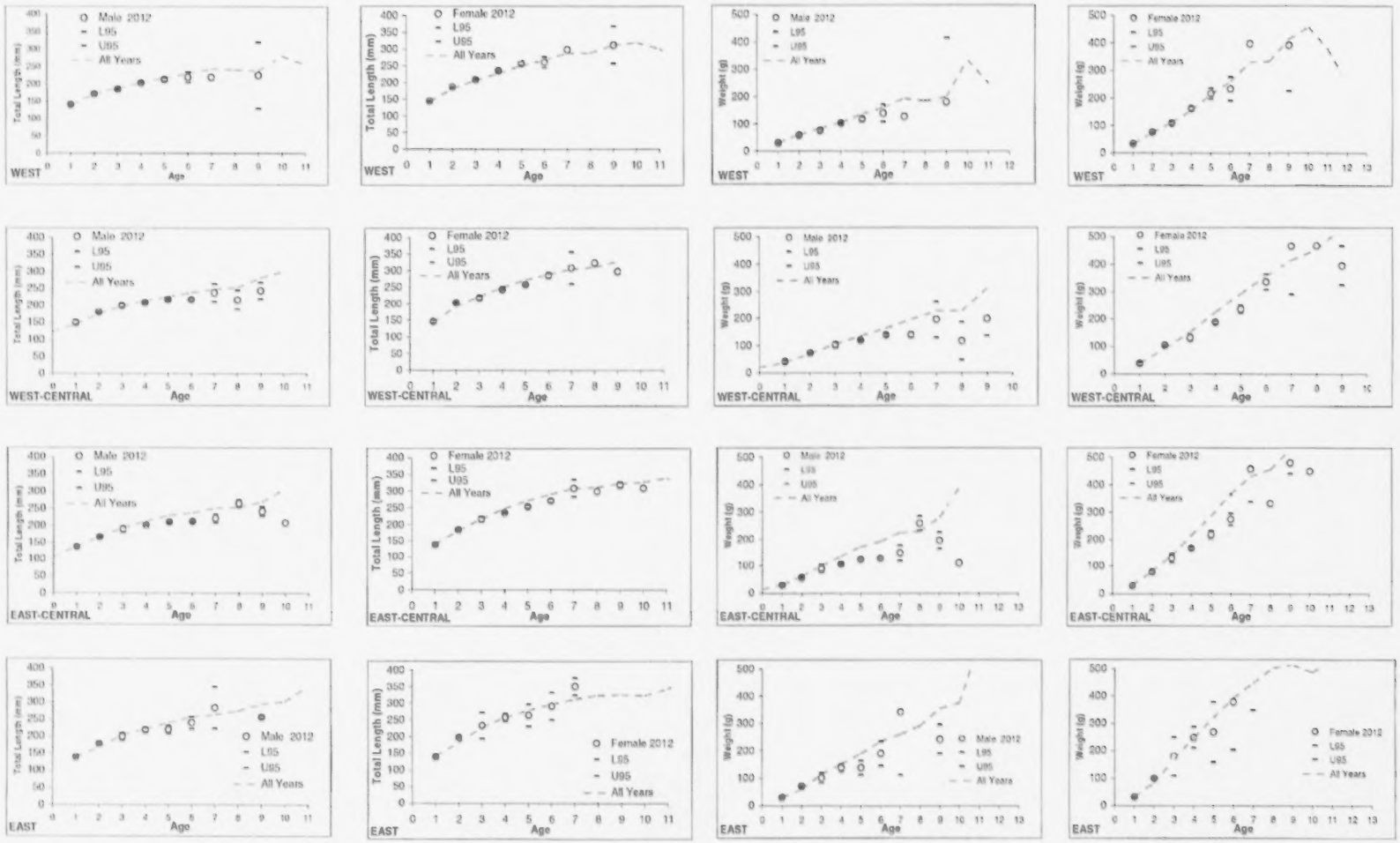

Figure 4.1.6 Yellow Perch mean total length (mm) and weight (g) of males and females at age for the west (top row), west-central, east-central and east (bottom row) basins in 2012 (circles). 95% confidence limits shown. Dotted line represents mean size at age for all years to 2011. Partnership Index Fishing, 1989-2012.

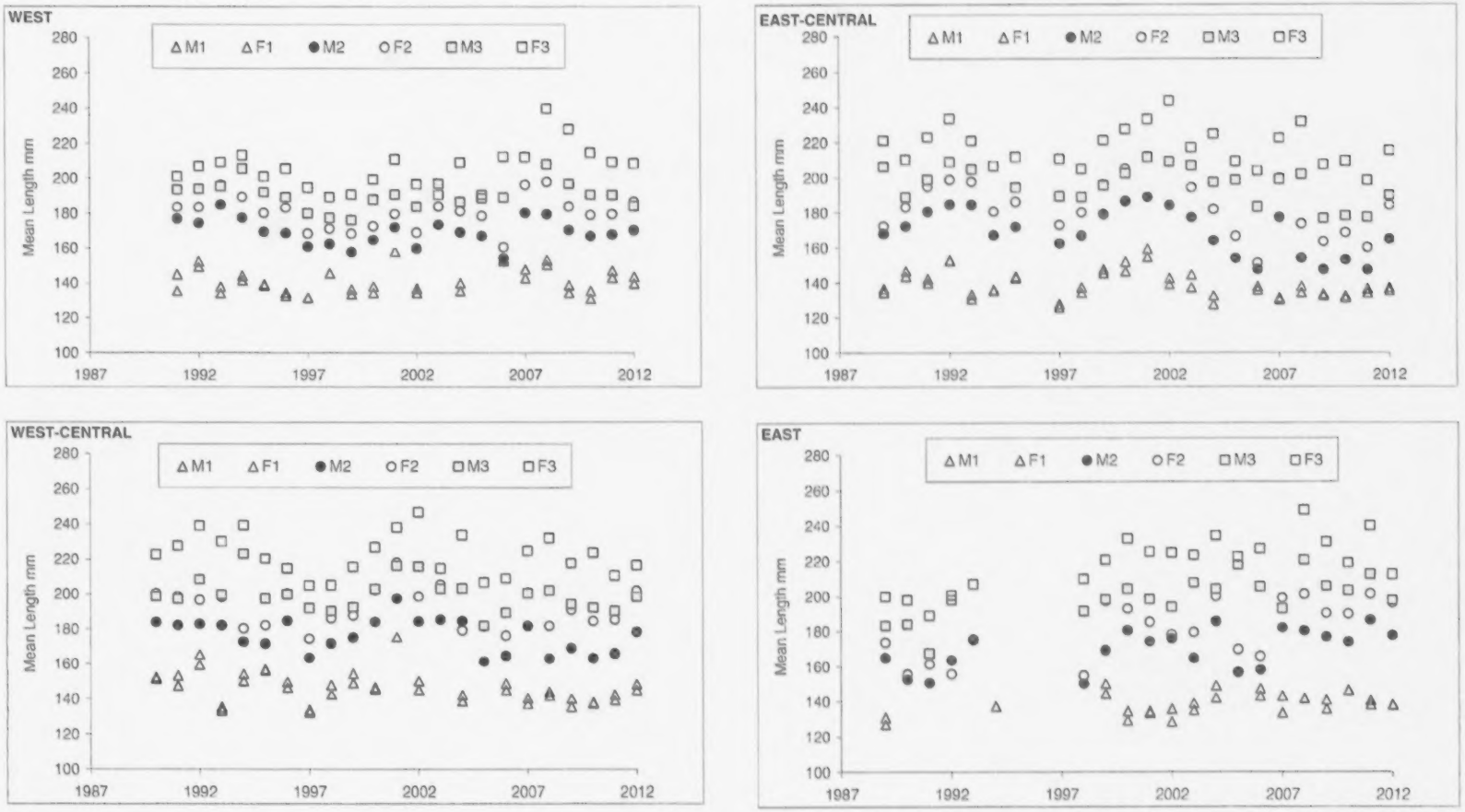

Figure 4.1.7. Mean total length (mm) of Yellow Perch ages 1, 2, and 3 by sex in the west, west-central, east-central and east basin surveys. East includes the Walleye Cap Area sites. M=male F=female. Samples with less than 6 fish were excluded. Mean is weighted by relative effort among mesh sizes. Samples restricted temporally for west (September), west-central (≥ October) and east-central (≥ October) and east basin (≤ September) surveys to negate bias due to interannual differences between sampling periods.

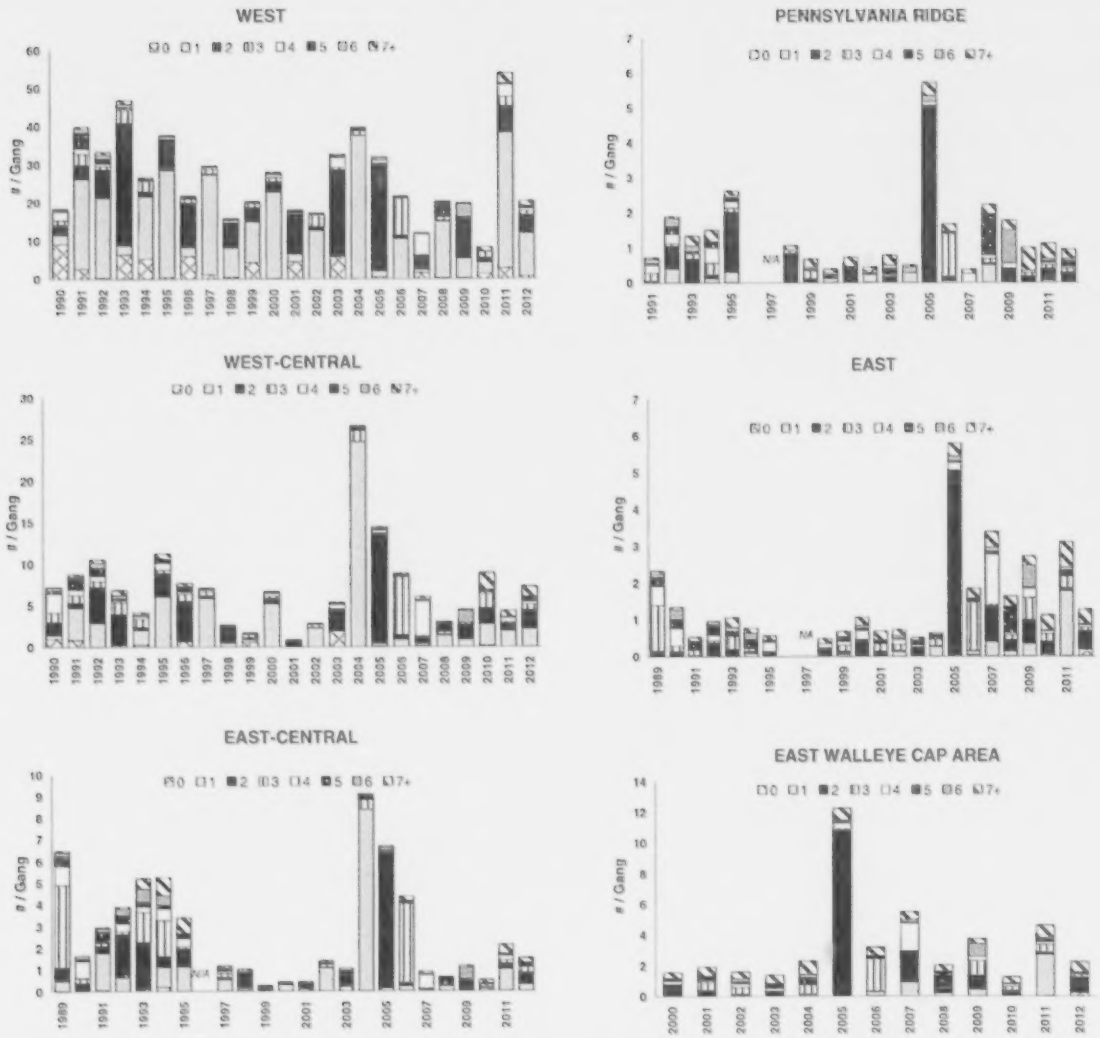

Figure 4.1.8 Walleye catch at age (numbers) per gang of index gill nets (canned and bottom), in the west, west-central, east-central, Pennsylvania Ridge and east basin Partnership surveys. Only standard canned sets are included in east basin and Pennsylvania Ridge graphs. East walleye cap area includes thermocline sets. East walleye cap area survey and east basin survey are not mutually exclusive. Note that catch rate and time axes differ among basins. Catch rates have been adjusted for Walleye lacking age data. Absent bars indicate years when study was not done. 1995 east basin survey had low sample size.

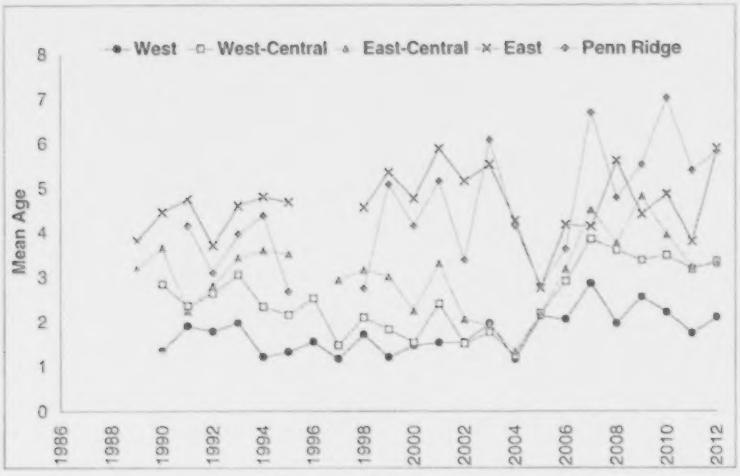

Figure 4.1.9 Mean age of Walleye caught in Partnership Index Fishing gill nets by basin, 1989-2012.

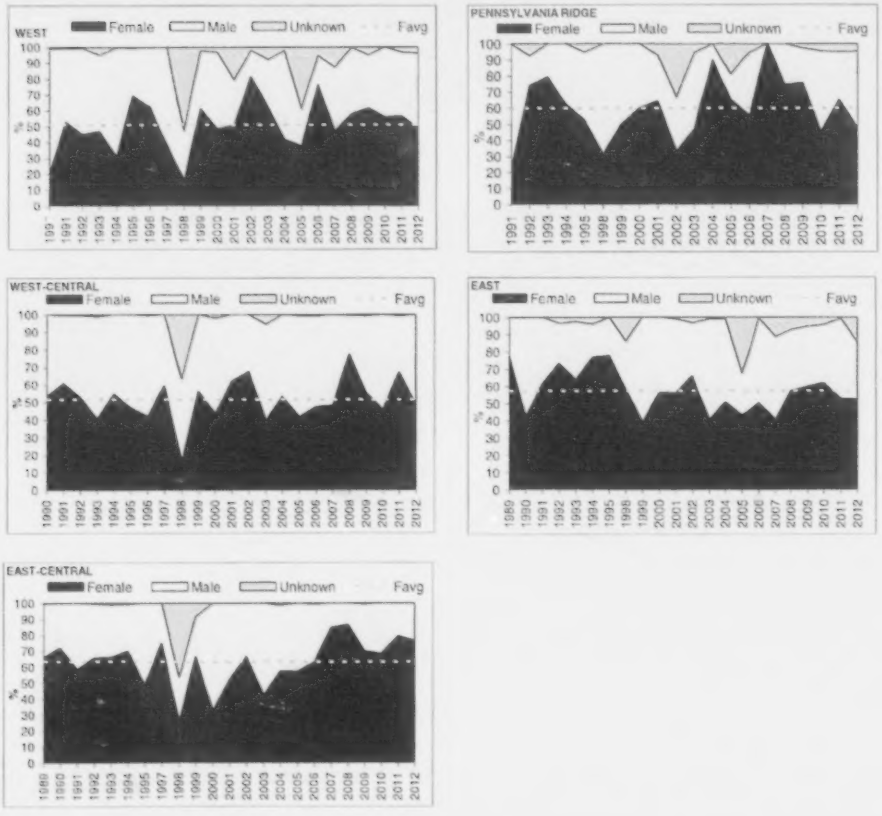

Figure 4.1.10 Proportion of Walleye ages 2 and older represented by each sex caught in fall Partnership Index Fishing gill nets, 1989-2012. Note absent years in east-central, Pennsylvania Ridge, and east basin time series. Dashed line represents average proportion of females over the time series.

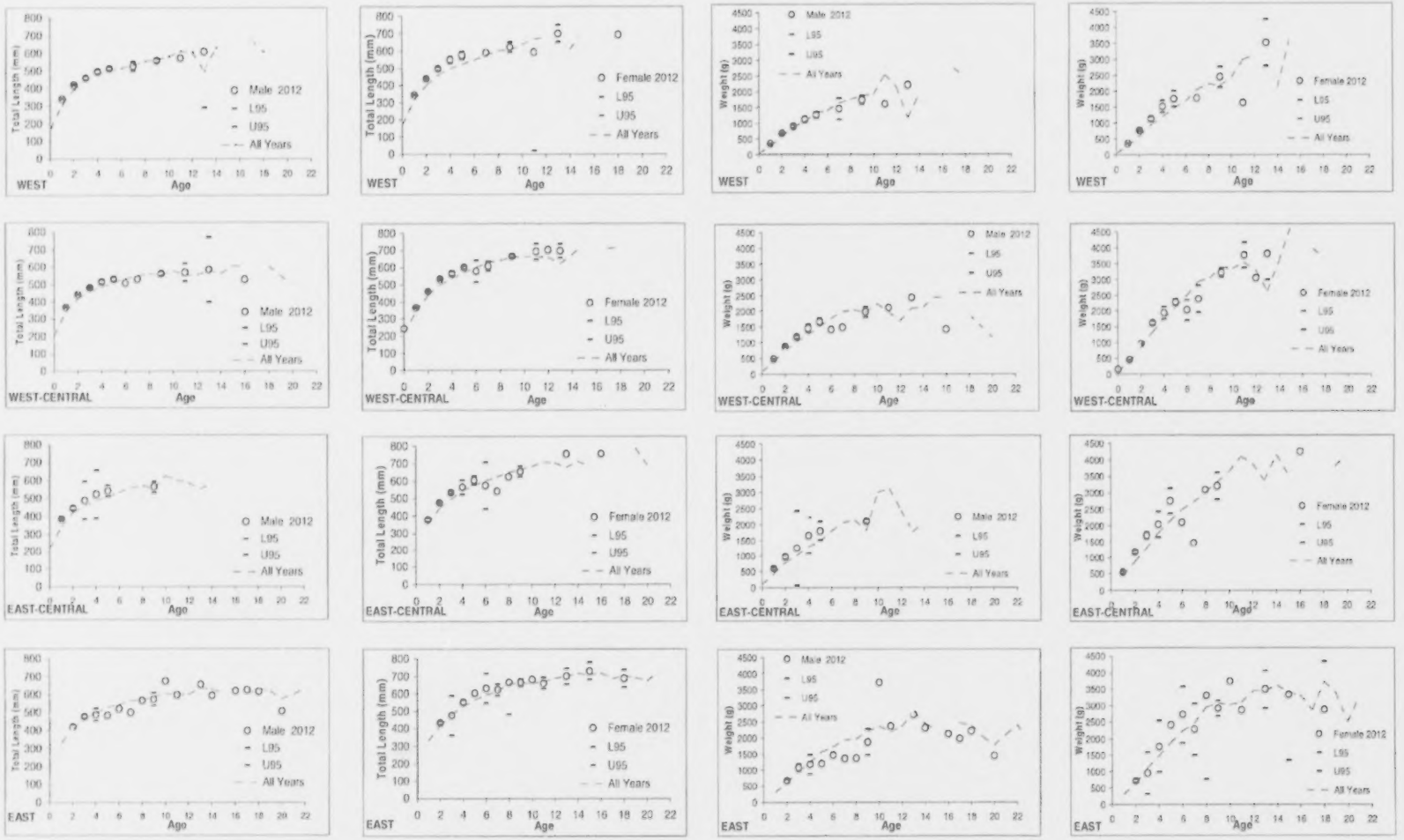

Figure 4.1.11 Walleye mean total length (mm) and weight (g) of males and females at age for the west (top row), west-central, east-central and east (bottom row) basins in 2012 (circles). 95% confidence limits shown. Dotted line represents mean size at age for all years to 2011. Partnership Index Fishing, 1989-2012.

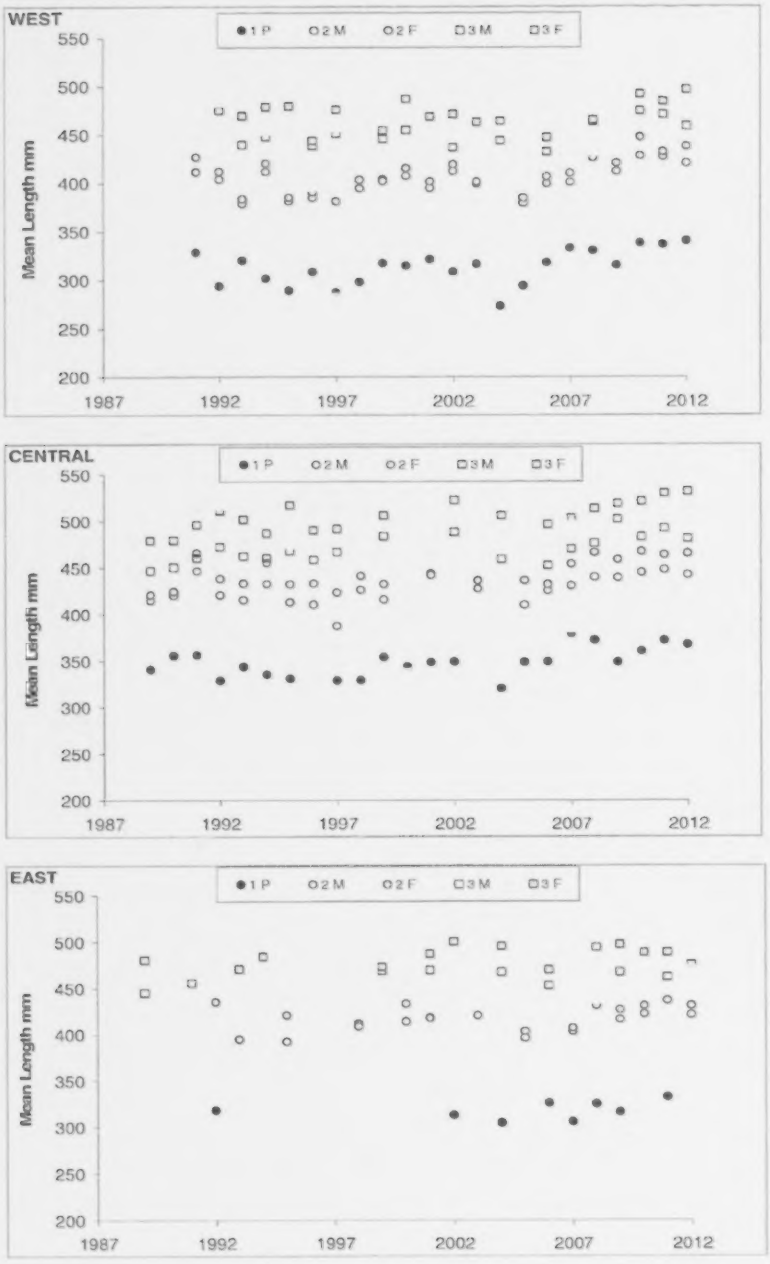

Figure 4.1.12 Mean total length (mm) of Walleye ages 1, 2, and 3 by sex in the west, central and east basin surveys. Central includes west-central and east-central basin surveys. East includes Pennsylvania Ridge, east, and Walleye Cap Area surveys. M=male F=female P=sexes pooled. Age 1 includes both sexes due to the large fraction of yearlings with sex undetermined. Samples with less than 6 fish were excluded. Samples restricted temporally for west (September), west-central (≥ October), east-central (≥ October), and east basin (≤ September) surveys to negate bias due to interannual differences between sampling periods.

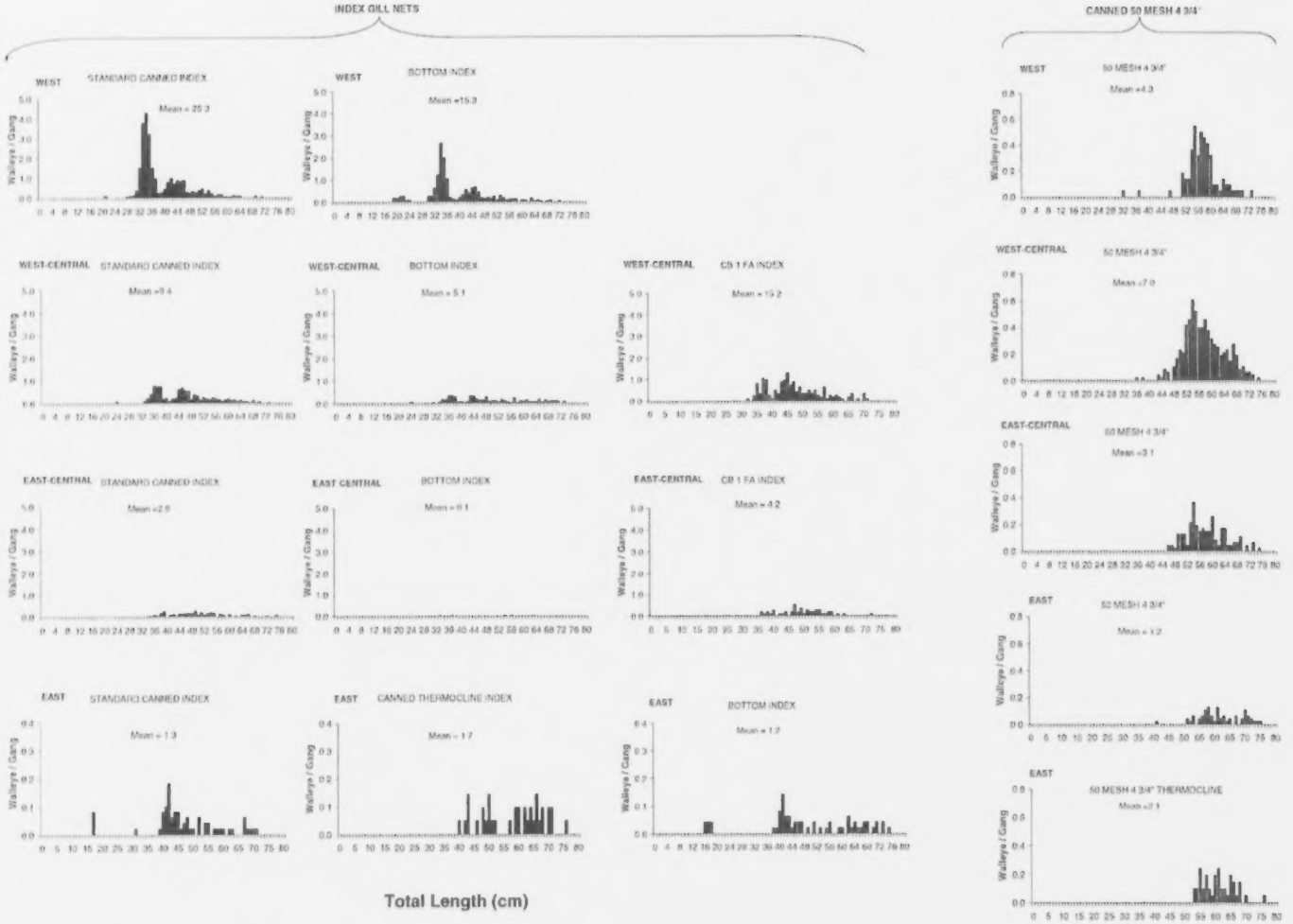

Figure 4.1.13 Walleye catch rates in 2012 by 1 cm length intervals in west basin (top row), west-central (2nd row), east-central (3rd row) and east basin (bottom row) in standard index canned gill nets, bottom nets, central basin 1 fathom canned nets, canned thermocline nets (east only) and in 50 mesh 4.75" canned nets (column on far right). All graphs have same x axes (length). East includes Pennsylvania Ridge and east basin surveys fished at all depths. Partnership Index Fishing, 2012.

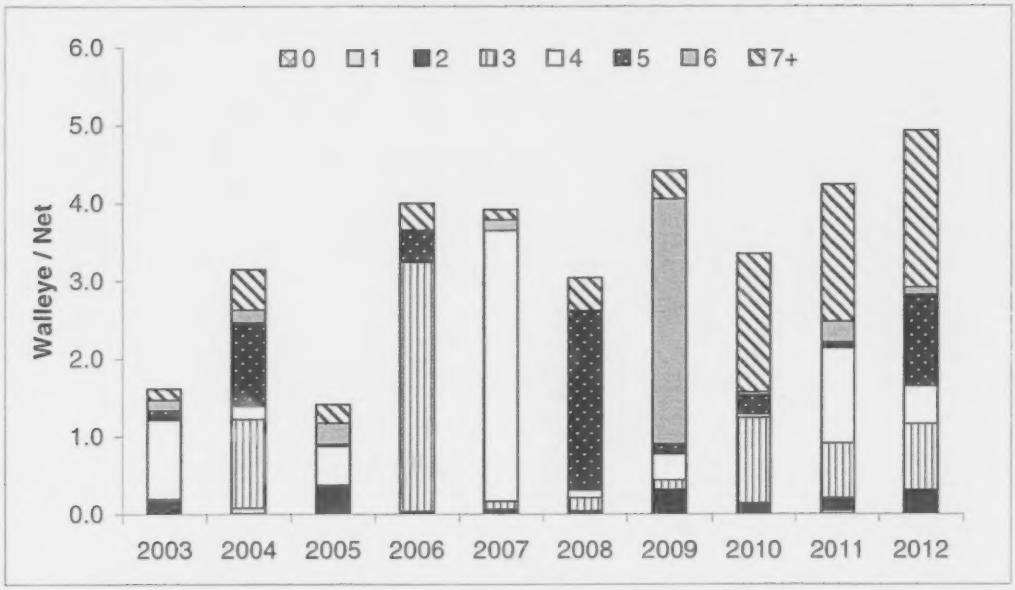

Figure 4.1.14 Walleye catch at age per 50 mesh deep 121 mm, 34 m canned gill net fished adjacent to index gill nets in the west, west-central, and east-central basins. All canned depths were included.

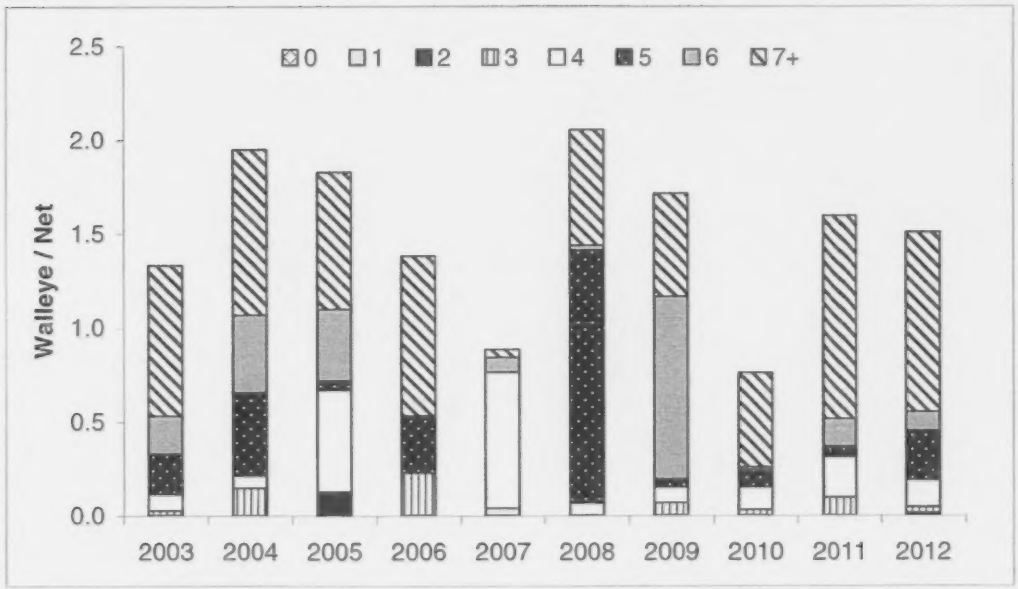

Figure 4.1.15 Walleye catch at age per 50 mesh deep 121 mm, 34 m canned gill net fished adjacent to index gill nets in the Pennsylvania Ridge, east, and Walleye Cap Area surveys. All canned depths were included.

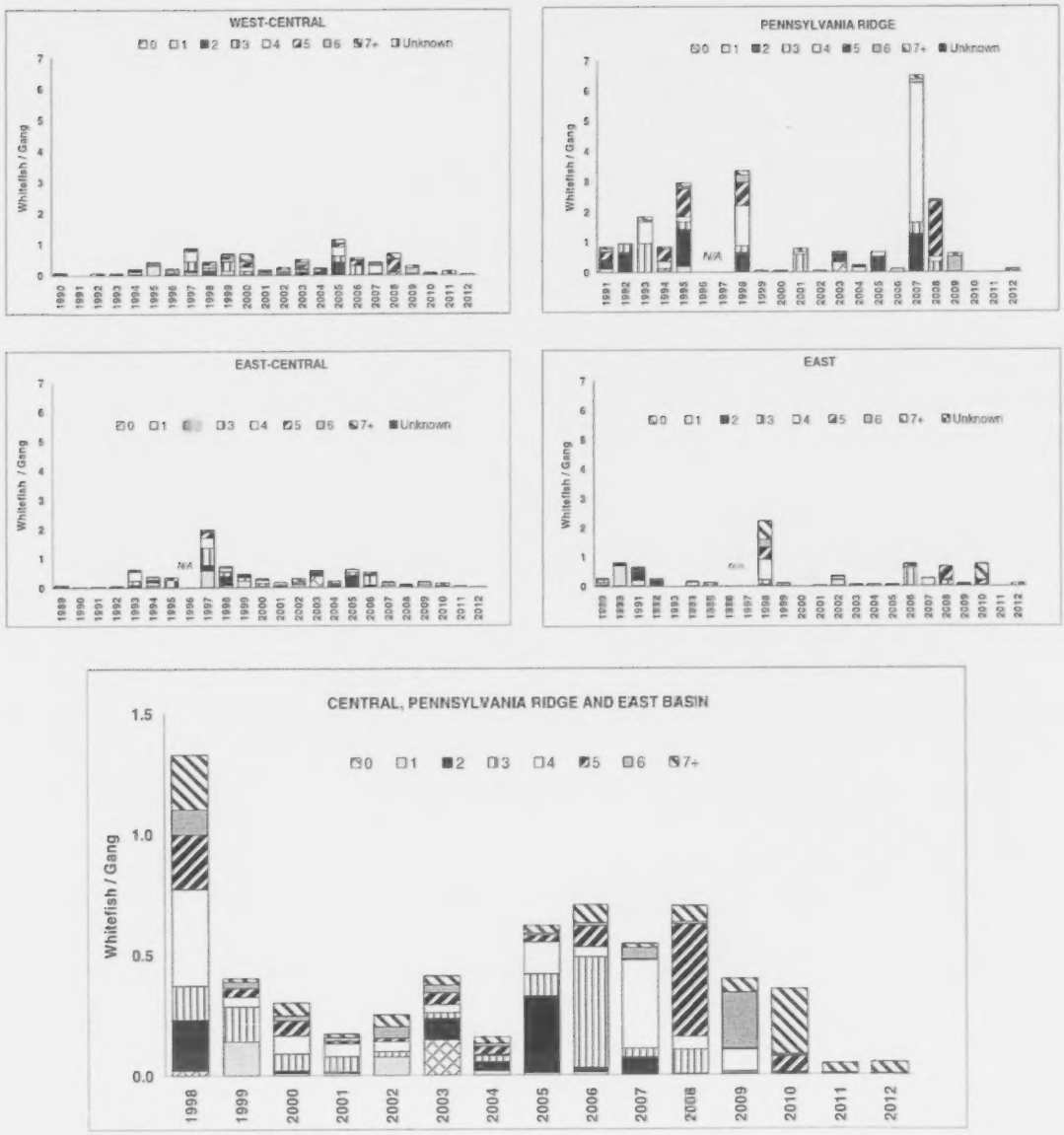

Figure 4.1.16 Lake Whitefish catch at age (numbers) per gang of index gill nets (canned and bottom), in the west-central, east-central, Pennsylvania Ridge, east basin and with basins pooled. Only standard canned sets included in east basin and Pennsylvania Ridge graphs. Whitefish samples lacking age data are represented by the "unknown" series. East basin 1995 based on few sites. Pooled basins includes extra Walleye Cap Area sites. Pooled basin series begins in 1998 to represent years in which all basins were sampled.

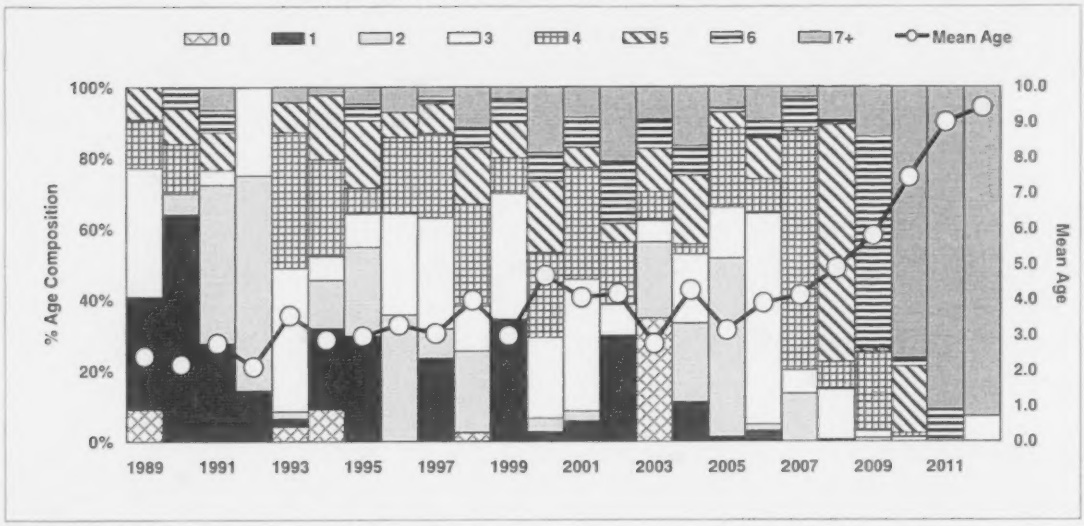

Figure 4.1.17 Lake Whitefish age composition and mean age (line) from Partnership Index Fishing, all basins combined, all index gear included. Ages 7 and older pooled in 7+ group. Otolith and scale ages were determined in 2012.

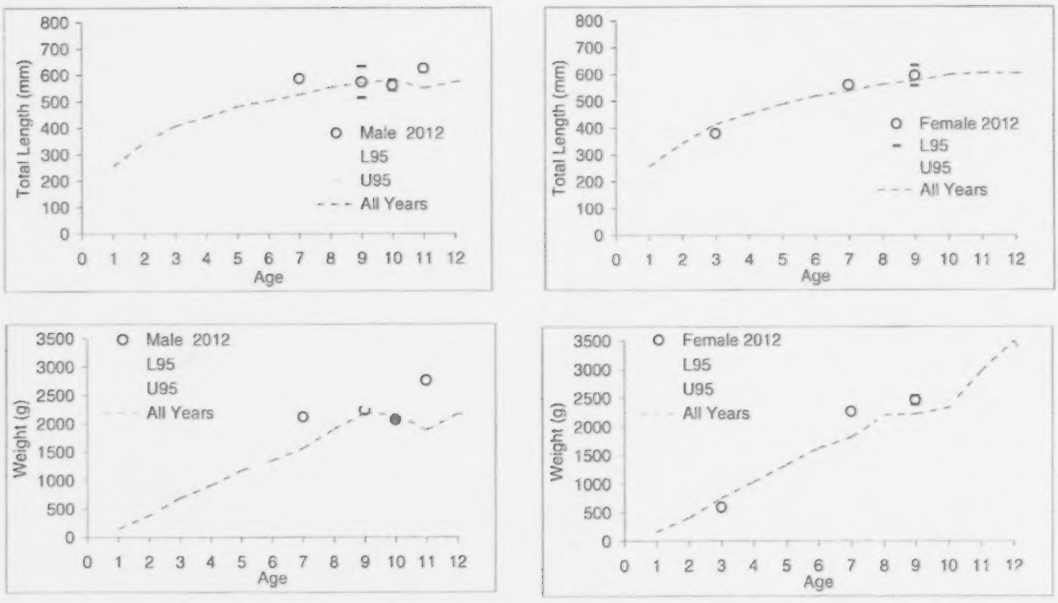

Figure 4.1.18 Mean length (top) and weight (bottom) at age for male (left) and female (right) Lake Whitefish, 2012 (circles). 95% confidence limits shown. Dotted line represents mean size at age 1989-2011, combined. Ages based on scales prior to 2006. Partnership Index Fishing, 1989-2012, all basins.

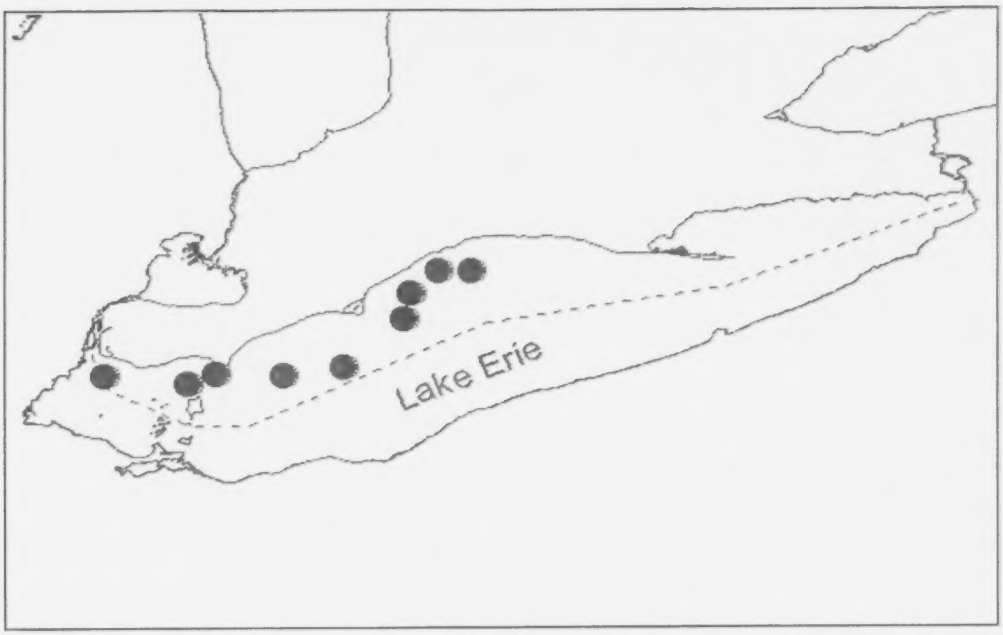

Figure 4.1.19 Partnership Index Fishing survey locations where paired monofilament and multifilament gill nets were fished canned during 2012.

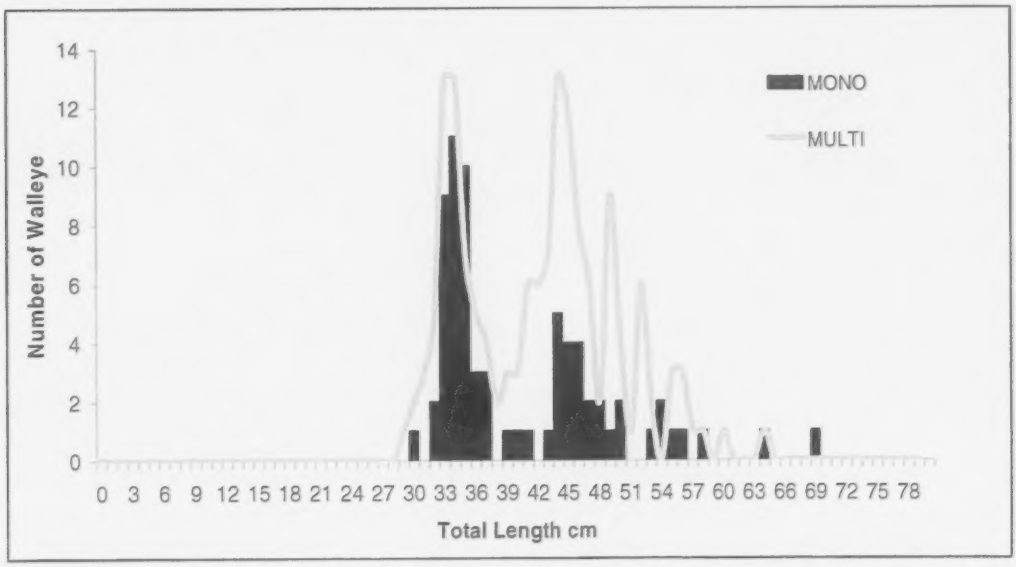

Figure 4.1.20 Walleye length frequency distribution from paired monofilament and multifilament gill net sets canned at nine locations in the west and central basin surveys in 2012.

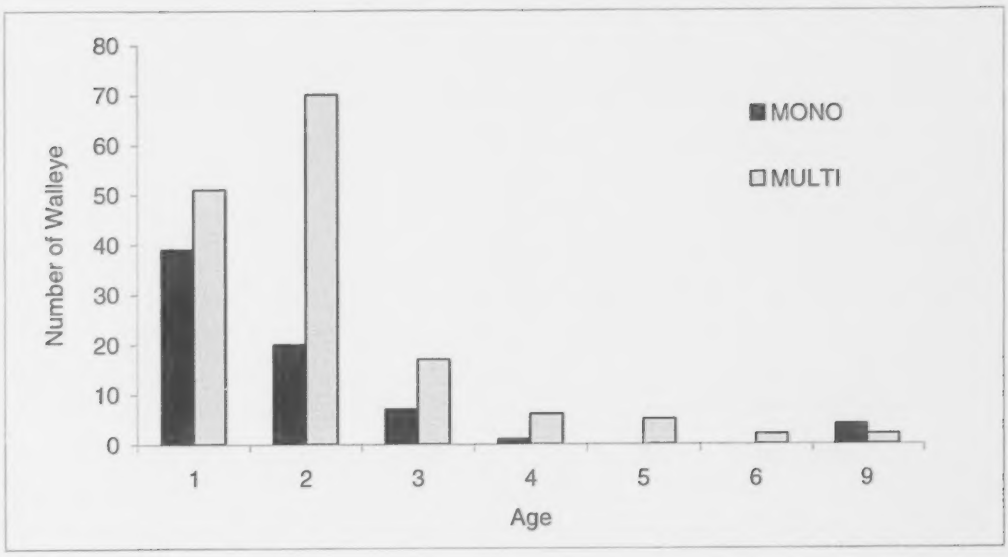

Figure 4.1.21 Walleye age distribution from paired monofilament and multifilament gill net sets canned at nine locations in the west and central basin surveys in 2012.

4.2 Index Trawling: Western Lake Erie

West Basin Bottom Trawling

The western basin interagency trawling index, conducted by Ontario and Ohio, was completed during August, 2012. The study is used to assess year class strength of species based on catches of young-of-the-year, yearling and older fish. Ontario survey results describe cohort strength by species as observed in Ontario waters. Data from Ontario and Ohio DNR are combined in order to create a more spatially extensive survey, producing results that may differ from individual data sources. Lake Erie task groups use these values to project abundance of two-year-old Yellow Perch and Walleye in advance of recruitment to fisheries. Species composition and trends in forage abundance are also described by index trawling. Length and weight measurements were recorded to describe trends in growth. Subsamples of Yellow Perch were aged using scales and otoliths.

The gear used was a two seam, 33' Biloxi bottom trawl (38' ground line) with a ½" cod end liner. Trawls in Ontario waters of western Lake Erie took place over two weeks from August 13 to August 22, 2012 (Figure 4.2.1). Unlike 2009, 2010 and 2011, hypoxic conditions (dissolved oxygen < 2 mg / l) did not occur in the west basin during the 2012 trawl survey. Dissolved oxygen ranged from 3.6 to 9.3 mg/l with the lowest concentrations (3.6, 6.1 mg/l) occurring at sites 18 and 17 respectively, southeast of Pelee Island.

Due to concerns about the potential effects of hypoxia on the distribution of juvenile percids and other species, representatives from task groups, the Standing Technical Committee, researchers from the Quantitative Fisheries Center at Michigan State University and Ohio State University (OSU) developed an interim policy for the assignment of bottom trawl status. Informed by literature (Eby and Crowder 2002, Craig and Crowder 2005) and field study (Ohio DNR / OSU) concerning fish avoidance of hypoxic waters, an interim policy was agreed upon whereby bottom trawls that occurred in waters with dissolved oxygen less than or equal to 2 mg/l would be excluded from

analyses applied retroactively from 2009. This interim policy will be revisited in the future following an improved understanding of the relationship between dissolved oxygen and the distribution of fish species and their various life stages in Lake Erie. To this end, OMNR initiated a midwater trawl pilot study during the last week of August 2012. This study has been designed to compare the vertical distribution of species in relation to dissolved oxygen. Methodology and results for this study are described.

Bottom trawl indices of abundance expressed as number caught per hectare (CPHA) are presented for young-of-the-year (YOY) fish, yearling-and-older (YAO) and small bodied fish with age groups pooled (all ages) for the period 1988-2012 (Table 4.2.1). Decade (2003-2012) and time series (1988-2012) means are presented for comparison. Additional summaries are presented for yearling Yellow Perch and Walleye which used length and age data for age classification.

For the eighth consecutive year, catches of young-of-the-year (YOY) White Perch exceeded all other species and age groups combined, representing 76% of all fish caught (Table 4.2.1). White Perch was the only species with a 2012 year class assessed as strong relative to both the long term and decade averages. Gizzard Shad, Freshwater Drum and White Bass YOY abundances appeared moderate in strength. Walleye, Rock Bass, Smallmouth Bass and Yellow Perch young-of-the-year abundance indices were low relative to recent and long term means. YOY White Crappie were not caught in 2012 but have been caught periodically.

The YOY Yellow Perch index was the lowest since 2004, but was similar in magnitude to the 2009 cohort (Figure 4.2.2). According to the YOY Yellow Perch catch rate, the 2008 year class was strongest since the 2003 year class. The YOY Walleye catch rate in 2012 (3.2 YOY/ha) was lower than, but comparable to the 2011 catch rate (3.7 YOY/ha) and approximately half the catch rates observed in 2009 (6.3 YOY/ha) and 2010 (6.2 YOY/ha) (Figure 4.2.3). Based on YOY indices, the 2007 cohort (10.4 YOY/ha) was the strongest observed since the 2003 cohort (117.4 YOY/ha).

No species exhibited strong abundance indices as yearling and older (YAO) fish in 2012 with the possible exception of YAO Gizzard Shad, which are caught infrequently likely due to gear avoidance (Table 4.2.1). Yearling and older (YAO) catch rates were of moderate strength for White Perch and Freshwater Drum (Table 4.2.1). Indices were weaker for yearling and older White Suckers, Yellow Perch, Smallmouth Bass and Brown Bullhead. Yellow Perch YAO abundance was low, due mostly to the catch rate of yearling Yellow Perch which was the 4th lowest over the 1988-2012 series (Figure 4.2.4). The yearling and older Walleye catch rate in 2012 was weak (Table 4.2.1), influenced by low catches of yearlings (Figure 4.2.5). Yearling Walleye CPHA was the lowest since 2007 (2006 year class). Since the 2003 cohort (71 YRL/ha), the 2010 cohort (3.4 YRL/ha) was the next largest but was comparable to the 2007 cohort (3.2 YRL/ha). This is in contrast with YOY walleye catch rates in which the 2007 cohort was assessed to be the strongest year class that followed the 2003 cohort. Yearling and older Channel Catfish, Common Carp, White Bass, Rock Bass and Quillback Carpsucker indices were low in 2012. During 3 early years of this survey (1988, 1992, 1993), catches of Burbot were recorded that cannot be confirmed. The code for this cold water species resembles other species common to the west basin (Trout-perch and Freshwater Drum) leaving in question the species designation.

Forage species, which remain potential prey for the duration of their life histories, were caught in moderate numbers in 2012 (Table 4.2.1). Most (99%) of the forage fish were composed of Emerald Shiners, juvenile Cyprinids, Trout-perch, and Round Gobies. Alewife which have been scarce or absent since 2003, were present in 2012 catches as YOY. Rainbow Smelt catch rates were relatively weak in 2012, consisting mostly (79%) of YOY. Silver Chub abundance in 2012 (2.8/ha) was slightly below the decade mean (3.1/ha) but less than the long term mean (5.5/ha) in Ontario waters of western Lake Erie. The Silver Chub is currently listed as *Threatened* under the Endangered Species Act of Ontario. Mimic Shiners were relatively abundant in 2012. Spottail Shiners and Logperch were caught in low numbers in 2012 relative to their short and long time series. The vulnerability of some species and age groups to capture in bottom trawls may be low or variable due sometimes to changes in vertical distribution in response to abiotic conditions. For additional focus on this topic, refer to the west basin midwater trawling study later in this section.

Catch rates for species encountered infrequently (10 year average CPHA < 0.2) are presented in Table 4.2.2. Three (3) YOY Channel Catfish and 1 YOY Sunfish (Centrarchidae) were caught in 2012. Single specimens of yearling and older Shorthead Redhorse, Silver Redhorse, and Yellow Bullhead were caught in 2012. Two (2) Brook Silversides and 3 Goldfish were caught in west basin bottom trawls during 2012.

In 2012, the average total length of YOY Yellow Perch (66 mm) was slightly above the 1988-2012 mean (65mm) (Figure 4.2.6). YOY Yellow Perch mean weight in 2012 was 2.8 g (STD = 1.1). The average total length of YOY Walleye in 2012 (160 mm) was well above average (133 mm) and the highest in the time series (Figure 4.2.7). The mean weight of YOY Walleye in August, 2012 was 32.4 g (STD=8.1), which was heavier compared to 2011 (19.4 g). The average length of yearling Yellow Perch continued to remain above average in 2012 (Figure 4.2.8). Similarly, the average total length of yearling Walleye remained above the time series average in 2012 (Figure 4.2.9).

References

Eby, L.A. and L.B. Crowder. 2002. Hypoxia-based habitat compression in the Neuse River Estuary: context-dependent shifts in behavioral avoidance thresholds. Can. J. Fish. Aquat. Sci. Vol. 59, 2002

Craig, J.K. and L.B. Crowder. 2005. Hypoxia-induced habitat shifts and energetic consequences in Atlantic croaker and brown shrimp on the Gulf of Mexico shelf Mar Ecol Prog Ser. Vol. 294: 79–94.

West Basin Midwater Trawling

In recent years, some of the west basin interagency trawl locations were hypoxic near the lake bottom. To address the variability of bottom trawl abundance indices associated with changing environmental conditions, a pilot midwater trawl study was conducted from August 27 to August 29, 2012.

The research vessel Keenosay fished midwater trawl gear at 7 stations with replicates on bottom, suspended below surface and in the middle of the water column where depths permitted (at 4 stations: 8, 12, 18, 24 ≥ 9m) for a total of 18 samples (Figure 4.2.10). Locations were selected from the interagency bottom trawl project based on depth strata, spatial representation and to some degree, catches of young-of-the-year percids during west basin interagency bottom trawling in 2012.

The mid-water trawl had a 3-m square opening, with 102, 76, 51, and 25 mm graded mesh running from the gape to 13 mm mesh in the cod-end. Trawl duration was 10 minutes at 3.0 knots. Water temperature / dissolved oxygen profiles were logged at each location at the start and end of the first trawl at each site. Catches were sorted by species and size into age groups so that all percids (Walleye and Yellow Perch) and large fish were counted in full while volumetric subsamples were taken, and then expanded for small bodied forage species.

During the study, dissolved oxygen ranged from 3.3 to 8.6 mg/l with temperatures between 23.7 and 24.8 ° C. The lowest dissolved oxygen value observed (3.3 mg/l) was measured on bottom at the end of the trawl at site 8 whereas dissolved oxygen measured on bottom at the start of the trawl was 8.2 mg/l.

Catch rates (number per hectare) by species and age group are presented for areas fished in the water column (bottom, middle, top and combined) in Table 4.2.3. Catch rates of all species and age groups combined were highest on bottom (15,287 fish/ha), followed by the middle (8,881 fish/ha) and the top of the water column (7,464 fish/ha). All YOY Walleye were caught (4.7 YOY/ha) in trawls

fished on bottom. Of the 9 YOY Walleye caught in total, 5 were caught at site 8 where dissolved oxygen differed most between the start and end of the trawl (difference = 4.9 mg/l). Most YOY Yellow Perch were caught on bottom (202.6 YOY/ha), but some YOY Yellow Perch were caught while fishing the middle of the water column (29.5 YOY/ha). The highest catch of YOY Yellow Perch occurred at site 18 (140 YOY) while the second highest catch was at site 8 (100 YOY). All yearling Walleye were caught in bottom trawls (5.6 YRL/ha) while Walleye ages 2 and older were caught on bottom (1.5/ha) and in the middle of the water column (0.9/ha). Yearling and older (YAO) Yellow Perch were caught primarily on bottom (68.1 YAO/ha) with few caught near the top of the water column (0.5 YAO / ha).

Emerald Shiners (66%) and YOY White Perch (29%) comprised the majority (95%) of fish caught in midwater trawls. Emerald Shiners (ES) were abundant throughout the middle (8,776 ES/ha), top (7,324 ES/ha) and bottom (6,034 ES/ha) of the water column. YOY White Perch were caught primarily on bottom (8,033 YOY / ha) with few caught in the middle area (17.6 YOY/ha). Other species caught on bottom and in pelagic trawls included YOY Gizzard Shad, YOY Alewife, YOY White Bass, Brook Silversides, and Rainbow Smelt. The remaining species-age groups were caught exclusively on bottom (Table 4.2.3).

During 2012, environmental conditions combined with low percid year class strength did not allow any definitive conclusions to be made concerning the effects of hypoxia on the vertical distribution of percids. These results were useful however, as a reference describing the vertical distribution of percids and other species under conditions that prevailed during the study. This survey will be repeated in 2013.

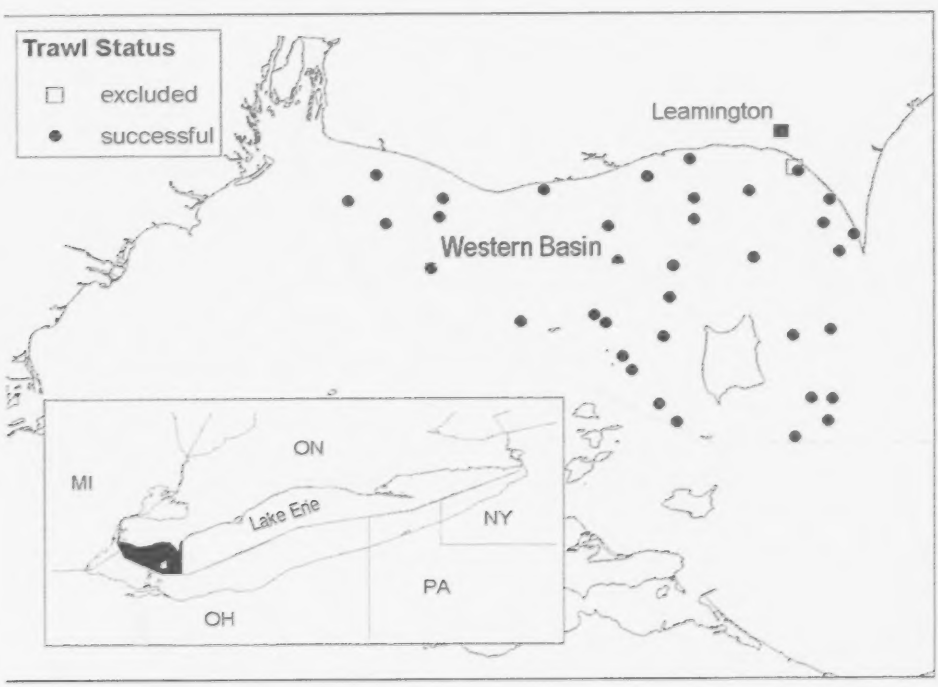

Figure 4.2.1 Ontario bottom trawl index locations fished in the western basin of Lake Erie during August 2012. Thirty-six (36) stations were completed. No sites were excluded in 2012 due to hypoxia.

Table 4.2.1 Mean catch per hectare (CPHA) of abundant species as young-of-the-year, yearling-and-older and all ages, collected during interagency bottom trawling in western Lake Erie 1988-2012 by the OMNR Lake Erie Management Unit. Means are presented for 2003-2012 and 1988-2012. Species with long term mean CPHA less than 0.2 were excluded. These other species appear in Table 4.2.2.

Species	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	Average 03 - 12	Average 88 - 12
young-of-the-year																											
White Perch	4,988.7	6,046.9	7,725.0	3,878.4	1,183.6	1,083.1	1,054.4	293.5	1,009.5	118.4	124.4	232.9	898.3	1,489.9	358.0	1,312.8	4,657.0	1,762.1	3,254.0	4,265.0	1,947.0	2,477.0	1,303.2	754.9	4,504.5	2,417.8	2,268.1
Gizzard Shad	956.4	1,197.1	1,099.6	59.0	260.4	826.4	103.9	81.6	2,409.1	33.8	413.3	214.0	1,646.5	2,224.8	47.2	436.0	23.4	152.7	174.1	340.0	2.6	793.8	47.8	22.8	291.3	212.0	554.3
Yellow Perch	202.1	513.7	470.9	72.4	173.9	499.3	554.8	741.4	1,814.9	71.6	188.1	468.2	46.5	655.9	14.5	2,220.6	57.7	117.6	361.0	331.7	663.0	74.8	161.2	220.7	72.5	390.5	434.8
White Bass	23.1	67.9	64.7	13.8	14.9	124.0	36.9	51.1	125.3	327.3	24.5	152.0	140.4	167.9	81.5	590.7	59.7	50.7	159.4	29.2	54.6	167.2	100.4	21.9	56.7	124.6	108.2
Freshwater Drum	72.1	10.2	2.4	84.4	0.5	3.1	0.7	0.2	5.9	1.4	2.9	9.8	23.0	16.9	107.8	117.4	33.8	20.1	1.4	7.0	-	0.4	5.9	1.9	6.5	27.5	21.5
Walleye	14.1	1.4	35.1	49.4	0.2	8.4	19.5	0.9	35.0	6.3	5.1	41.8	0.3	16.1	0.1	117.4	5.5	5.3	0.8	10.4	0.7	6.3	6.2	3.7	3.2	14.5	15.7
Smallmouth Bass	0.1	0.2	2.1	-	-	0.8	1.6	6.6	4.6	2.0	1.2	1.0	0.7	1.4	8.8	0.1	-	1.7	6.1	0.9	1.7	0.6	2.5	1.6	0.3	2.2	1.9
Rock Bass	-	-	0.1	0.5		0.3	0.3	0.2	0.3			0.6	0.9	1.3	0.7	-	0	0.3	0.3	-	0.3	0.4	0.9	3.0	0.1	0.6	0.4
White Crappie	0.5	0.	-	8.8		-	-	-	-			-	-	-	-	0.1	-	-	0.1				-	-	-	0.0	0.4
yearling-and-older																											
Yellow Perch	169.4	7.8	52.0	89.3	70.7	99.3	68.3	137.5	374.7	74.1	98.7	187.8	328.9	131.3	120.1	470.2	402.9	294.9	83.5	84.2	536.2	416.6	154.8	139.6	75.4	252.6	186.7
White Perch	113.1	21.4	12.1	138.6	394.4	92.9	1.9	35.2	27.3	2.7	3.8	109.6	55.8	41.3	27.3	1,142.3	193.3	70.2	126.3	24.3	268.6	99.1	95.1	76.7	78.9	200.2	130.1
Freshwater Drum	143.9	0.1	22.2	36.5	20.2	37.5	9.5	17.2	39.6	14.3	24.4	33.3	61.4	51.2	98.7	67.5	90.9	91.3	58.0	29.5	36.6	41.2	38.6	47.0	38.7	58.0	46.0
Walleye	15.2	2.9	3.5	6.7	24.3	3.3	3.1	11.4	2.2	4.0	6.2	5.2	20.9	2.3	4.0	3.1	72.4	12.7	4.0	1.7	4.1	4.5	2.0	4.1	2.7	10.5	9.1
Gizzard Shad	1.7	-	0.2	41.2	0.1	0.2	0.1	0.7	0.2	9.7	0.1	0.7	0.4	0.1	0.7	-	-	0.1	0.2	0.1	-	-	0.2	0.2	0.4	0.2	2.3
White Bass	6.0	0	1.0	0.2	1.8	12.3	0.1	1.9	-	0.8	-	0.5	8.2	0.2	1.9	2.1	3.7	0.4	2.3	0.7	0.8	0.9	0.6	8.7	0.2	2.0	2.2
Channel Catfish	6.5	-	1.8	1.8	0.7	0.8	0.1	0.4	1.2	-	0.1	1.1	0.4	0.4	0.7	0.9	0.7	1.5	2.3	0.4	0.8	0.8	2.3	1.6	0.3	1.1	1.1
Carp	4.1		2.9	2.8	1.3	0.6	0.7	1.8	0.7	0.5	0.5	0.8	0.8	0.4	1.0	0.3	1.8	1.2	0.8	0.5	0.7	0.3	0.9	0.5	0.3	0.7	1.0
White Sucker	0.3		0.5	0.5	0.9	0.3	0.1	1.5	0.3	0.3	-	1.3	0.4	1.0	2.0	0.7	1.7	2.3	0.7	1.6	0.5	2.0	0.5	1.4	0.4	1.3	0.8
Rock Bass	1.7		1.0	1.2	0.6	1.2	2.5	1.3	2.2	0.4	0	0.3	0.7	1.8	0.6	0.3	0.2	0.3	-	0.6	0.2	1.2	-	0.2	0.1	0.3	0.7
Brown Bullhead	2.7		1.2	0.5	0.2	-	-	-	-	0.1	-	0.8	0.3	2.5		-	-		0.2	2.7	1.0		0.6	0.1	0.1	0.4	0.5
Smallmouth Bass	0.1		0.9	-	3.6	1.1	0.7	1	0.3	0.1	0.4	1.4	0.1	0.6		0.3	0.2		0.2	0.1	0.3		-	0.6	0.2	0.2	0.5
Burbot	0.2		-	-	0.6	9.7		-	-	-		-	-	-	-	-	-	-	-	-	-		-	-	-	-	0.4
Quillback	-		0.5	0.6	-	0.1		0.5	0.4	0.2		0.2	0.2	0.2	0.9	0.1	2.0	0.1			0		0.4	0.1		0.3	0.3
all ages																											
Alewife	877.9	254.0	313.7	51.3	3,188.8	2,112.9	30.4	73.2	742.4	66.4	33.8	107.0	536.7	520.5	218.4	-	-	-	0.3	0.5	-	-	0.1	-	0.2	19.9	365.1
Trout-perch	213.3	142.6	347.7	479.3	71.1	267.6	182.9	63.9	338.0	61.5	67.1	128.7	321.6	187.4	196.8	40.8	670.4	311.9	281.9	92.4	34.9	457.4	281.1	54.6	97.0	229.0	215.6
Emerald Shiner	2.6	3.3	143.3	12.0	60.4	30.9	21.0	108.2	129.2	61.3	6.1	39.3	34.8	52.6	98.5	633.8	88.4	118.9	65.8	285.8	141.0	249.4	83.7	63.3	416.4	204.1	118.0
Round Goby	-	-	-	-	-	-	-	-	-	2.7	83.8	92.1	111.1	84.2	117.1	59.6	207.5	59.8	170.6	71.4	172.0	199.7	16.8	43.7	41.8	105.5	61.4
Spottail Shiner	46.9	21.6	31.7	49.5	40.6	29.3	28.3	331.5	40.4	81.2	87.9	75.3	23.1	66.5	13.1	15.9	16.9	94.5	17.5	31.7	5.5	4.9	29.8	1.2	1.1	21.1	47.4
Rainbow Smelt	1.4	3.1	10.9	0.2	64.3	18.7	0.1	2.6	1.5	2.0	6.5		39.7	0.2	6.4	29.2	82.1	2.0	52.6	45.9	94.8	65.8	0.5	8.0	2.3	34.5	21.2
Cyprinidae	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.1	15.7	14.2	-	23.2	0.4	6.5	214.8	25.0	11.0
Silver Chub	2.8	0.1	1.5	7.1	21.8	9.5	4.7	1.5	5.3	10.6	9.4	17.4	4.4	6.2	5.2	4.1	8.7	6.1	0.9	1.7	0.2	1.9	1.4	1.3	2.8	3.1	5.5
Logperch	2.7	1.7	1.8	8.5	0.2	0.3	20.1	1.3	8.2	2.0	3.4	0.2	0.1		-	0.6	3.9	2.2	2.1	0.6	2.3	13.2	1.1	1.2	0.1	2.5	3.1
Mimic Shiner			-	-	-	-	-	0.3	-	-	-	-	-			-	-			21.3		1.0	0.7	0.3	0.6	2.2	1.0
Total	7,869	8,295	10,350	5,095	5,630	5,254	2,147	1,969	7,218	956	1,192	1,923	4,307	5,725	1,532	7,267	6,684	3,181	4,843	5,696	3,960	5,103	2,340	1,491	5,910	4,364	4,636.3
# of trawls	37	45	39	42	36	27	38	34	32	32	32	30	32	36	34	35	36	36	36	36	36	29	35	33	36	35	35

CPHA (catch per hectare) = Unweighted, arithmetic mean catch per hectare

Samples collected since 2009 with dissolved oxygen ≤ 2 mg / l were excluded based on an interim interagency protocol adopted in 2012.

Table 4.2.2 Mean catch per hectare (CPHA) of species caught infrequently as young-of-the-year, yearling-and-older and all ages, collected during interagency bottom trawling in western Lake Erie 1988-2012 by the OMNR Lake Erie Management Unit. Means are presented for 2003-2012 and 1988-2012. Species with long term mean CPHA greater than 0.2 were excluded. These other species appear in Table 4.2.1.

Species	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	Average 03 - 12	Average 88 - 12
young-of-the-year																											
Largemouth Bass	-			4.59																	0.11	-	0.11			0.02	0.19
Quillback	1.70			-				-						-							-		-		-	-	0.05
Channel Catfish				0.31				0.29						0.11										-	0.26	0.02	0.04
Bluegill																				-			0.22	0.12	-	0.03	0.01
Morone sp.															-					0.22						0.02	0.01
Pumpkinseed															0.12					-						0.01	0.00
Black Crappie			-												-					0.11						0.01	0.00
White Sucker			0.10																						-	-	0.00
Centrarchidae			-																						0.10	0.01	0.00
yearling-and-older																											
Shorthead Redhorse				0.09			0.09									0.52	1.32	0.11			0.65	0.47	0.10	0.12	0.11	0.31	0.14
Largemouth Bass				1.77			-			-						-		-		-	-	-	-	-	-	0.07
Lake Sturgeon							0.18			0.12				-		0.11				0.10		-	0.11	0.12		0.04	0.03
Golden Redhorse														0.10			-					0.51		-	-	0.05	0.02
Silver Redhorse	-								-					0.10			0.11		-			0.13		0.12	0.11	0.04	0.02
Black Crappie	0.10								0.09	-								-	0.25				-			0.02	0.02
Silver Lamprey	-								-	0.12								0.11					0.21	-		0.03	0.02
Moxostoma sp.		-								-								-	-				-	0.23	-		
Yellow Bullhead													-				-	-	0.11				-	-	0.11	0.02	0.01
Lake Whitefish													0.12					-		-						-	0.00
Muskellunge	-												-							0.11						0.01	0.00
White Crappie	0.11																			-						-	0.00
Goldfish-Carp Hybrid							-													0.11						0.01	0.00
Northern Pike							0.10																-			-	0.00
Longnose Sucker																							0.10			0.01	0.00
all ages																											
Johnny Darter						-	2.08	-	1.27									-		-						-	0.13
Brook Silverside	-		-			0.77		0.10										0.11	-	0.76				0.48	0.21	0.14	0.10
Goldfish	0.11		0.10															-	0.11	-				-	0.29	0.04	0.02
Notemigonus sp.	0.21																							-	-	-	0.01
Tubenose Goby	-							-					-										-	0.12		0.01	0.00
Blacknose Dace								0.10								-								-		-	0.00
Common Shiner		-						-					-			0.09										0.01	0.00
Spottin Shiner		0.09														-	-									-	0.00
Notropis sp.																	0.09									0.01	0.00
Total	1.82	0.09	0.20	6.76	-	0.77	2.45	0.49	1.36	0.24	-	-	0.12	0.31	0.12	0.72	1.52	0.33	0.47	1.41	0.76	1.11	0.85	1.31	1.19	0.87	0.98
# of trawls	37	45	39	42	36	27	38	34	32	32	32	30	32	36	34	35	36	36	36	36	36	29	35	33	36	35	35

CPHA (catch per hectare) = Unweighted, arithmetic mean catch per hectare

Samples collected since 2009 with dissolved oxygen ≤ 2 mg / l were excluded based on an interim interagency protocol adopted in 2012.

Table 4.2.3 Mean catch per hectare in mid-water trawl gear caught fishing on bottom and suspended in the middle and top of the water column at 7 sites. Depths were adequate at 4 sites to fish at 3 depths.

Species and Age Group	Area in Water Column			
	Bottom	Middle	Top	All
White Perch Young-of-the-Year	8,033.3	17.6		3,128.0
Gizzard Shad Young-of-the-Year	547.1	42.5	75.9	251.7
Yellow Perch Young-of-the-Year	202.6	29.5		85.3
White Bass Young-of-the-Year	64.0	11.3	5.1	29.4
Walleye Young-of-the-Year	4.7			1.8
Freshwater Drum Young-of-the-Year	0.5			0.2
White Perch Yearling and Older	93.2			36.3
Yellow Perch Yearling and Older	68.1		0.5	26.7
Freshwater Drum Yearling and Older	51.2			19.9
Walleye Yearling	5.6			2.2
Walleye Ages 2 and Older	1.5	0.9		0.8
White Bass Yearling and Older	1.5			0.6
Channel Catfish Yearling and Older	1.0			0.4
Gizzard Shad Yearling and Older	0.5			0.2
White Sucker Yearling and Older	0.5			0.2
Common Carp	0.5			0.2
Emerald Shiner	6,033.9	8,776.1	7,324.0	7,145.0
Brook Silverside	36.9	0.9	57.6	37.0
Trout-perch	76.4			29.7
Silver Chub	39.0			15.2
Round Goby	13.7			5.3
Rainbow Smelt	6.7	0.9		2.8
Cyprinid	3.2			1.2
Alewife	1.1	0.9	1.0	1.0
Spottail Shiner	0.5			0.2
Total	15,287.2	8,880.5	7,464.1	10,821.2
Samples	7	4	7	18

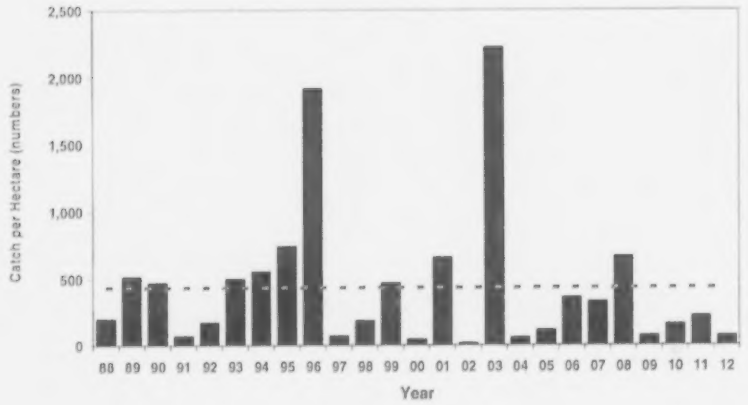

Figure 4.2.2 Number of young-of-the-year Yellow Perch caught per hectare during interagency trawling (1988-2012) in western Lake Erie. Horizontal line indicates 1988-2012 average catch per hectare.

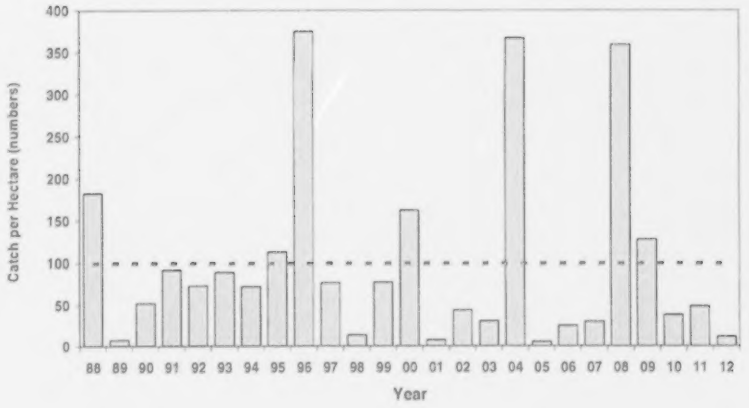

Figure 4.2.4 Number of yearling Yellow Perch caught per hectare during interagency trawling (1988-2012) in western Lake Erie. Horizontal line indicates 1988-2012 average catch per hectare.

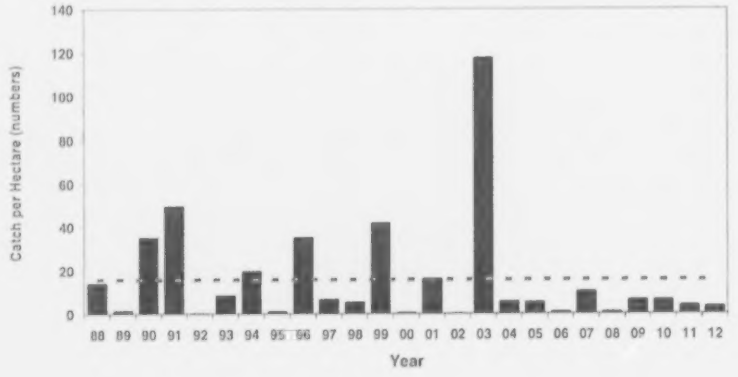

Figure 4.2.3 Number of young-of-the-year Walleye caught per hectare during interagency trawling (1988-2012) in western Lake Ene. Horizontal line indicates 1988-2012 average catch per hectare.

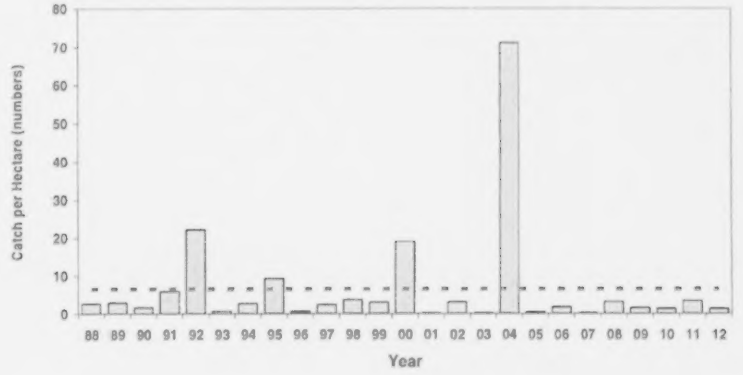

Figure 4.2.5 Number of yearling Walleye caught per hectare during interagency trawling (1988-2012) in western Lake Erie. Horizontal line indicates 1988-2012 average catch per hectare.

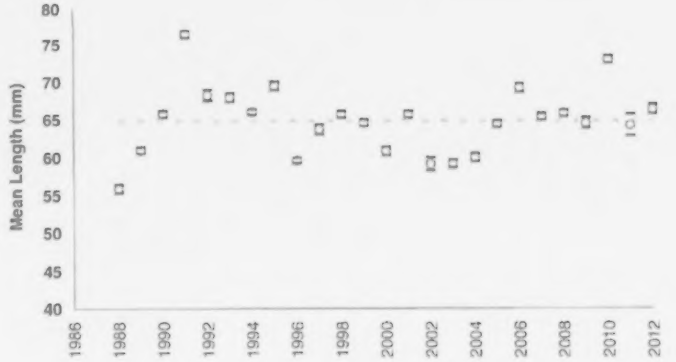

Figure 4.2.6 Mean total length of young-of-the-year (YOY) Yellow Perch with 95% confidence limits. Interagency trawling, Ontario waters of western Lake Erie, 1988-2012. Horizontal broken line indicates the average of the time series.

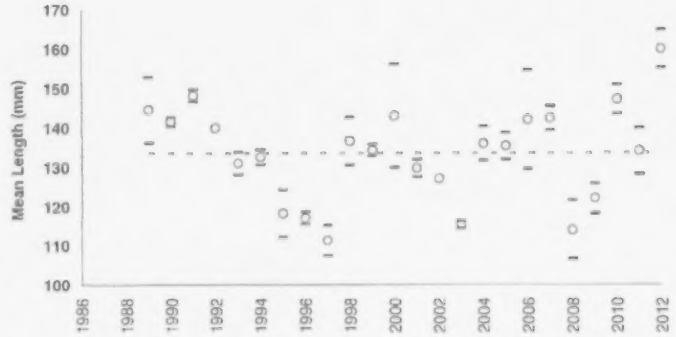

Figure 4.2.7 Mean total length of young-of-the-year (YOY) Walleye with 95% confidence limits. Interagency trawling, Ontario waters of western Lake Erie, 1988-2012. Horizontal broken line indicates the average of the time series. Two (2) YOY were caught in 1992 and one (1) in 2002.

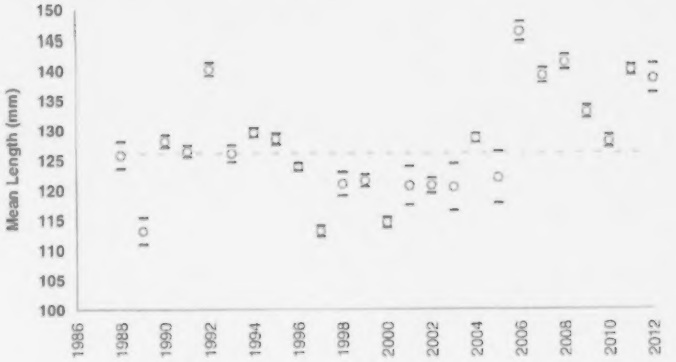

Figure 4.2.8 Mean total length of yearling Yellow Perch with 95% confidence limits. Interagency trawling, Ontario waters of western Lake Erie, 1988-2012. Horizontal broken line indicates the average of the time series.

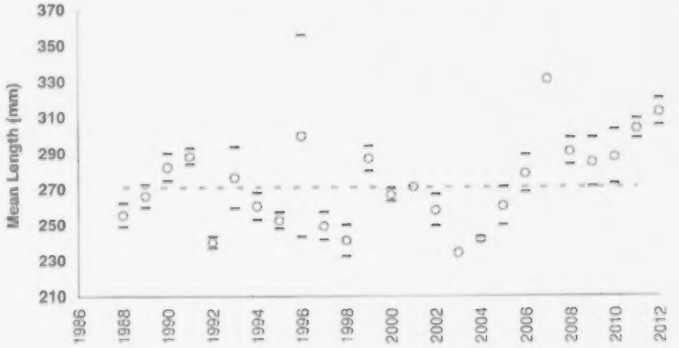

Figure 4.2.9 Mean total length of yearling Walleye with 95% confidence limits. Interagency trawling, Ontario waters of western Lake Erie, 1988-2012. Horizontal broken line indicates the average of the time series. In 2007 one (1) yearling walleye was caught.

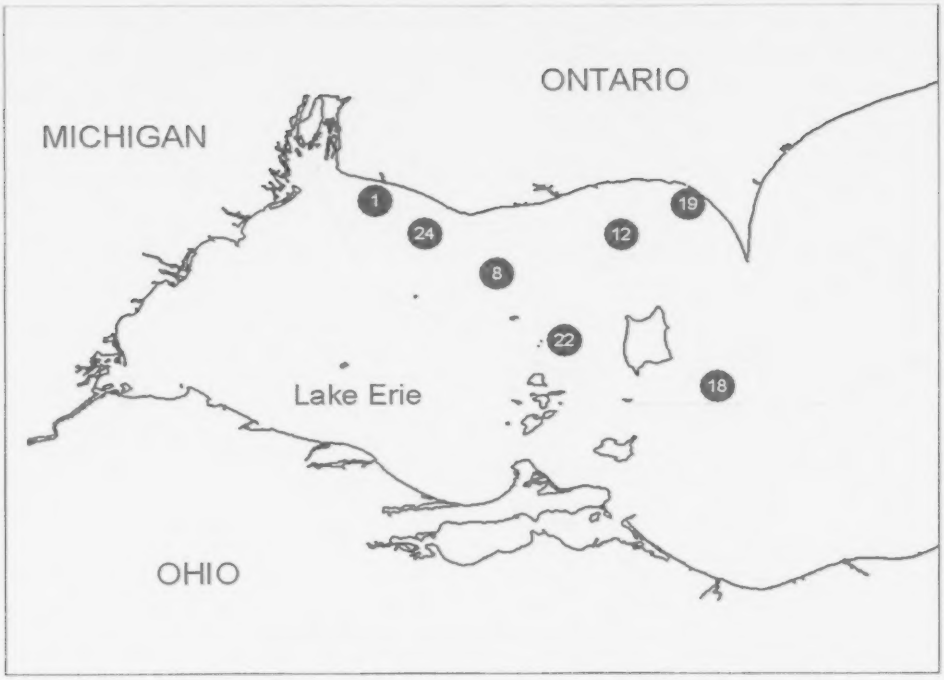

Figure 4.2.10 Ontario midwater trawl locations fished in the western basin of Lake Erie during August 2012. Seven (7) sites were selected from the bottom trawl survey which took place during the previous 2 weeks. Site numbers are shown.

4.3 Long Point Bay Index Trawl Surveys

Current assessment of juvenile fish in Long Point Bay consists of three independent bottom trawl surveys conducted during early fall each year in three areas (Figure 4.3.1). Two surveys targeting Yellow Perch have been conducted at up to four fixed locations annually since 1980 in Inner Long Point Bay (Inner Bay Trawl Assessment) and the inshore waters of outer Long Point Bay (Nearshore Outer Bay Trawl Assessment) with a 6.1 m modified Biloxi bottom trawl. A third trawl survey was initiated in 1984 to measure recruitment of Rainbow Smelt. In this survey, a 10 m Biloxi bottom trawl was fished at four fixed stations in the offshore waters of Outer Long Point Bay (Offshore Outer Bay Trawl Assessment).

Trawling at all nearshore index stations was conducted weekly during September and October from 1980 to 2010. Beginning in 2011, nearshore trawling during October was discontinued necessitating an adjustment of the standard survey period from eight to four or five weekly sample events from August 26th to October 5th across the entire time series. Total annual trawling effort for the Inner Bay and Nearshore Outer Bay assessments was approximately 640 and 480 minutes, respectively during the survey years to and including 2010. Total annual trawling effort was reduced to 400 and 300 minutes, respectively following implementation of a truncated survey period in 2011.

Trawling at the Offshore Outer Bay stations occurred weekly during September and October from 1984 to 1995. In 1996, September trawling was suspended and all future sampling at the offshore trawl stations was abbreviated to weekly sample events during October plus a few days before and

after. In 2012, the standard survey period for reporting offshore trawl data was further refined to include up to five weekly sample events from September 25th to November 8th across the entire time series, resulting in an annual total trawl effort of 400 minutes.

Trawl catches were sorted by species and age group. Species catch was classified as young-of-the-year (YOY) and yearling-and-older (YAO) based on a fork length criterion derived from examinations of size frequency distributions and age determination of representative juveniles from selected length classes. Random samples of YOY and YAO for selected species were measured for lengths and weight. Sex, maturity and age (from scale interpretations) were also recorded for YAO fish.

Relative abundance indices were expressed as arithmetic mean catch (number) per hectare (NPHa). Arithmetic means were calculated from the summed catch and effort of tows 1 and 2 at each location.

A new index of age 0 Yellow Perch abundance was introduced in 2010 that combines the annual recruitment estimates from each of three Long Point Bay trawl assessments into a single composite index series. Referred to as the Yellow Perch or Long Point Bay composite index (LPBc), this new method of reporting age 0 Yellow Perch abundance was created to better reflect the overall abundance of YOY perch in Long Point Bay following a shift in the spatial distribution of juvenile Yellow Perch from predominately nearshore to predominately offshore habitats since about 2003. The composite index combines the annual mean abundance (NPHa) estimates from each of the three trawl assessments and assigns a 3.6 times greater weight to the Offshore Outer Bay trawl mean estimate based on the proportion of the total surface area of Long Point Bay (including Inner Bay) represented by bottom depths greater than 5 m (78.3%) and less than or equal to 5 m (21.7%) according to the following equation:

$$LPBc_i = (OOB_i \times 0.783) + \frac{(IB_i \times 0.217)}{2} + \frac{(NOB_i \times 0.217)}{2},$$

where $LPBc_i$ is the age 0 Yellow Perch composite index in year i, and OOB_i, IB_i and NOB_i are the age 0 perch mean NPHa estimates for each of the three Long Point Bay trawl assessments in year i; Offshore Outer Bay (OOB), Inner Bay (IB), and Nearshore Outer Bay (NOB).

Yellow Perch

Index trawl assessments during 2012 once again showed that age 0 Yellow Perch were more abundant in offshore waters than in traditional near shore habitats of Long Point Bay (Tables 4.3.1 to 4.3.3). Age 0 Yellow Perch densities in 2012 were 21 to 3 times lower in the Inner Bay and the Nearshore Outer Bay trawl assessment areas, respectively than in the Offshore Outer Bay survey area, confirming a pattern that has predominated since about 2003. The two nearshore trawl assessments rank the 2012 year class in the 16th (Inner Bay) and 42nd percentiles (outer Long Pt. Bay) of their respective time series, whereas the offshore trawl assessment rank age 0 Yellow Perch recruitment (in 2012) in the 75th percentile. The Long Point Bay composite index indicates the 2012 year class was moderately weak (NpHa=27.4) compared to the long-term average (1984-2011 avg. NpHa=68.2). According to the composite index, the period since 2002 has featured three of the weakest (2002, 2004, 2009) and four of the strongest (2003, 2005, 2008, 2011) Yellow Perch year classes observed since 1984 (Figure 4.3.2).

In general, mean size of age 0 Yellow Perch has increased over the time series (combined nearshore trawl assessments, Figure 4.3.3). Maximum age 0 Yellow Perch size was observed in

2005. Although size decreased slightly in 2012, age 0 Yellow Perch have remained larger than average during the seven of the past eight years, although it should be noted that sample size was fewer than 10 fish during 2009 when juvenile Yellow Perch were smaller than average (Figure 4.3.3).

Although few in number, one year old fish were the dominant age class represented in the 2012 YAO Yellow Perch catch from the two Long Point Bay nearshore trawl assessments (Table 4.3.4).

Rainbow Smelt

Recruitment of age 0 Rainbow Smelt increased from 2011 (NPHa=509.2); the 2012 year class was well above average strength, ranking it the 5th highest (86thpercentile) among all years surveyed since 1984 (Table 4.3.3). Relative abundance of YOY Rainbow Smelt in the offshore waters of Long Point Bay in 2012 (NPHa=1658) was about 42% greater than the long-term average (1984-2011 avg. NPHa=955).

YAO Rainbow Smelt abundance increased slightly in 2012(NPHa=367.8) from comparatively low densities observed during 2011 (NPHa=277.1) and 2010 (NPHa=222.7), but remained below the long-term average. Age 1 Rainbow Smelt from the moderately weak 2011 year class accounted for 82% of the October 2012 YAO Smelt catch in number (Table 4.3.5). This percentage estimate was based on a MIX Analysis of Rainbow Smelt length distributions and age components which differ slightly from an estimate derived from values reported in Table 4.3.5.

Age 0 Rainbow Smelt mean length and weight increased in 2012 and both size measures were above their respective long-term averages (Figure 4.3.4). Age 1 Rainbow Smelt also increased above average size in 2012 (Figure 4.3.4).

Smallmouth Bass

Age 0 Smallmouth Bass abundance decreased in 2012 (NPHa=2.2), falling below the long-term average density of 16.2 bass/ha for the third consecutive year (Table 4.3.1). Mean total length of age 0 Smallmouth Bass has fluctuated between 60 and 90 mm during the 33 year time series of the Inner Bay trawl assessment (Figure 4.3.5). Age 0 Smallmouth Bass mean length increased and mean weight decreased slightly in 2012; in general, YOY Smallmouth Bass have been above average size during most years since 1998.

Table 4.3.1 Relative abundance (mean number per hectare) of selected young-of-the-year fish species caught in Inner Long Point Bay, Lake Erie during bottom trawl assessments (6.1 m trawl) , September, 1980-2012.

Year	Effort (min.)	Yellow Perch	Rock Bass	Smallmouth Bass	Largemouth Bass	Spottail Shiner	Banded Killifish	Johnny Darter	Sunfish (Lepomis spp.)	Round[a] Goby
1980	130	167.8	7.3	4.0	3 0	364.2	0.0	1.3	6.0	0 0
1981	220	534.9	2.9	0.0	0.0	2.4	0.0	0.4	11.5	0.0
1982	400	1026.8	12.1	11.8	3.4	126.9	0.3	1.3	0.0	0.0
1983	220	125.9	7.0	7.5	5.3	0.2	1.0	1.2	16.9	0.0
1984	400	761.7	41.1	2.3	6.8	37 4	1.3	0.9	108.2	0.0
1985	480	20.8	19.0	12.9	5 2	983.2	0.9	0.9	1.5	0.0
1986	400	1859.5	10.5	5.3	6.2	932.7	0.3	0.0	2.3	0.0
1987	400	3.8	6.9	5.0	6 9	195.2	0.0	0.0	6.8	0.0
1988	400	305.0	2.3	5.6	3.8	627.8	0.1	0.3	3.4	0.0
1989	400	457.7	13.2	5.3	6 9	871.9	23.2	25.6	69.3	0.0
1990	400	202.6	4.4	4.9	7.9	55.1	12.5	17.0	143.0	0.0
1991	400	144.0	4.1	13.1	7.7	382.6	10.6	23.4	8.9	0.0
1992	400	594.0	4.2	19.1	1.6	83 7	1.1	9.9	0.1	0 0
1993	400	239.8	22.3	26.4	2.9	97.5	6.1	11.1	198.7	0.0
1994	400	84.0	5.7	40.9	39.1	51.4	11.8	47.0	9.5	0.0
1995	400	5.3	82.3	19.6	74.4	116.8	52.6	57.3	68.0	0.0
1996	400	53.6	197.6	23.9	57.6	49.7	48.0	24.3	140.4	0.0
1997	400	21.5	23.9	72.0	17.2	79.6	19.3	41.9	3.1	0.0
1998	480	1005.9	17.6	13.3	11.8	171.7	226.3	16.5	14.7	0.0
1999	480	34.0	12.8	91.7	96.6	51.0	44.0	11.1	10.9	0.6
2000	400	1.2	37.8	7.9	5.1	2.4	11.8	4.3	173.0	26.5
2001	400	463.8	1.3	21.7	3.3	0.3	12.9	4.3	1.5	183.1
2002	400	8.3	11.8	14.0	24.8	0.0	74.0	7.3	52.0	56.2
2003	320	224.0	4.2	12.8	4.4	0.4	4.2	4.5	5.1	28.6
2004	480	0.1	0.2	12.0	0.8	0.2	0.3	16.2	0.1	95.4
2005	480	8.8	9.7	9.0	7.0	1.0	3.7	0.2	16.3	21.0
2006	400	0.3	0 5	5.0	3.8	0.1	0.4	12.0	0.1	34.0
2007	400	73.9	0.3	8.2	1.6	0.5	0.3	2.1	0.0	263.0
2008	400	0.3	1.3	8.4	1.2	0.0	0.5	0.1	0.4	211.8
2009	320	0.0	1.1	19.1	0.7	0.0	0.5	0.7	0.0	280.5
2010	400	5.7	0.0	11.0	5.8	0.0	0.9	1.2	0.3	135.1
2011	400	3.9	4 1	6.1	3.5	0.0	3.7	2.0	3.0	114.6
2012	400	1.6	0.3	2.2	1.0	0.0	1.4	1.0	0.0	79.8
Avg. for 1980-2011		263.7	17.8	16.2	13.3	165.2	17.9	10.8	33.6	45.3

[a] Abundance indices of Round Goby include all ages.

Table 4.3.2 Relative abundance (mean number per hectare) of selected young-of-the-year fish species caught in the nearshore waters of Outer Long Point Bay, Lake Erie during index bottom trawl assessments (6.1 m trawl), September, 1980-2012.

Year	Effort (min.)	Yellow Perch	White Perch	White Bass	Alewife	Gizzard Shad	Emerald Shiner	Spottail Shiner	Round[b] Goby
1980	209	21.1	0.0	10.6	8.4	14.7	40.8	101.8	0.0
1981	200	137.4	0.0	1.2	0.0	4.7	0.0	2.8	0.0
1982	200	69.6	0.0	1.0	214.5	2.6	1.0	103.0	0.0
1983 [a]	0								
1984	300	283.9	120.9	153.9	4.1	22.8	12.6	140.1	0.0
1985	360	2.4	0.6	29.6	27.0	7.0	65.0	858.1	0.0
1986	300	102.0	55.5	33.1	14.0	82.8	0.3	305.0	0.0
1987	300	3.4	1.4	0.5	28.5	9.3	12.4	203.5	0.0
1988	280	667.7	98.1	0.0	0.7	17.2	5.9	861.8	0.0
1989	240	296.9	3.4	12.7	31.3	7.5	0.9	1055.4	0.0
1990	300	43.3	79.2	8.8	0.2	8.3	0.0	1098.6	0.0
1991	299	15.5	0.9	0.2	6.0	0.5	26.7	571.1	0.0
1992	300	54.3	0.5	0.0	869.7	0.2	0.0	267.9	0.0
1993	240	21.6	12.5	0.4	0.2	2.6	0 0	1339.6	0.0
1994	240	159.8	40.5	0.0	6.7	31 7	1 5	409.4	0.0
1995	300	6.0	2.1	0.2	2.2	4.6	1 8	282.6	0.0
1996	300	199.1	28.3	0.3	0.0	74.1	0.3	1508.5	0.0
1997	300	18.9	12.0	0.2	0.2	2.7	1.2	1093.7	0.0
1998	300	114.9	0 1	0.0	0.0	3.7	0.0	588.1	0.0
1999	300	2.5	0.2	0.4	0.0	5.5	0.0	999.1	0.6
2000	300	10.2	3.5	0.2	8.2	9.3	0.0	851.1	37.0
2001	300	76.7	5.0	1.1	0.4	2.9	2.3	51.8	183.4
2002	300	0.6	0.0	0.0	12.2	1.6	0 2	16.6	150.9
2003	240	93.3	14.6	0.4	17.6	5.1	0.0	74.1	114.2
2004	360	0 5	0.2	0.0	1.5	1.0	258.3	43.8	94.4
2005	360	10.3	0.4	0.7	11.0	1.9	1.1	58.7	28.0
2006	300	2.8	1.2	0.3	711.8	28.7	12.4	19.8	32.7
2007	300	6.3	0.7	0.2	44.6	22.0	1.2	35.2	73.9
2008	300	4.9	2.1	0.5	11.9	4.0	0.5	37.8	63.4
2009	240	1.5	0.0	0.0	1.9	0.0	0 0	3.7	91.2
2010	300	13.2	0.0	0.3	0.0	3.8	0.0	3.0	67.6
2011	300	3.9	0.0	0.0	6.8	3.4	1.1	2.5	103.3
2012	300	11.3	0.9	0.2	6.0	20.0	23.8	19.1	68.0
Avg. for 1980-2011		78.9	15.6	8.3	65.9	12.5	14.4	419.0	33.6

[a] Index trawling discontinued during 1983.
[b] Abundance indices of Round Goby include all ages.

Table 4.3.3 Relative abundance (mean number per hectare) of selected young-of-the-year fish species caught in the offshore waters of Outer Long Point Bay, Lake Erie, during index bottom trawl assessments (10 m trawl), October, 1984-2012.

Year	Effort (min.)	Rainbow Smelt	White Perch	White Bass	Yellow Perch	Alewife	Gizzard Shad	Emerald Shiner	Round[a] Goby
1984	320	2206.3	13.7	166.2	7.3	22.4	14.6	0.1	0.0
1985	394	84.0	12.9	8.1	1.6	0.5	0.4	0.8	0.0
1986	380	2979.8	0.2	32.7	0.0	16.6	77.1	2.4	0.0
1987	440	267.6	0.7	0.1	0.0	19.8	0.8	46.2	0.0
1988	480	972.8	3.5	0.1	0.4	21.8	3.1	42.8	0.0
1989	400	1158.4	1.3	5.5	0.4	36.4	0.2	9.0	0.0
1990	400	1194.3	0.9	7.9	0.0	30.6	0.6	7.4	0.0
1991	400	54.4	13.3	3.8	0.7	82.0	2.1	12.0	0.0
1992	400	1468.8	0.0	0.0	0.0	4.8	0.0	5.5	0.0
1993	400	203.6	0.3	4.2	2.9	10.2	1.0	8.9	0.0
1994	400	341.9	0.8	2.1	10.6	8.3	18.6	55.3	0.0
1995	400	84.0	0.9	0.3	4.0	0.6	0.0	9.1	0.0
1996	240	353.2	0.3	0.3	7.9	0.0	0.3	390.7	0.0
1997	400	154.4	0.0	0.0	0.0	0.1	0.0	0.1	0.0
1998	400	422.5	0.5	0.1	8.1	1.4	4.9	19.6	0.0
1999	310	40.3	1.0	40.0	15.5	2174.5	65.2	15.1	0.2
2000	400	259.9	0.0	2.0	3.0	25.6	0.3	3.3	50.8
2001	400	2633.3	6.1	19.4	13.8	81.1	16.0	12.7	69.0
2002	400	142.5	0.0	0.0	0.0	35.3	3.2	9.5	127.0
2003	400	7058.1	16.2	2.0	240.6	0.5	68.6	3388.0	158.8
2004	400	132.2	0.0	0.0	0.1	0.3	0.2	20.3	323.8
2005	400	0.9	0.1	1.1	156.2	0.1	1.7	645.7	66.9
2006	400	1256.0	0.9	0.3	38.0	78.6	1.4	452.3	93.3
2007	400	991.3	0.1	0.2	70.0	1.0	34.6	29.3	973.2
2008	400	1293.0	5.4	1.3	356.0	2.3	86.5	16.0	452.6
2009	400	148.2	0.6	0.2	0.3	0.1	0.4	54.8	43.6
2010	400	326.9	1.6	0.4	63.5	0.9	13.3	117.6	9.7
2011	400	509.2	0.0	0.2	224.6	2.1	18.9	70.3	125.4
2012	400	1657.7	0.8	0.2	33.2	707.3	47.6	438.3	129.0
Avg. for 1984-2011		954.9	2.9	10.7	43.8	94.9	15.5	194.4	89.1

[a] **Abundance indices of round goby include all ages.**

Table 4.3.4 Relative abundance (mean number per hectare) of Yellow Perch at ages 0 to 3 caught with a 6.1 m bottom trawl in Long Point Bay, Lake Erie, September, 1980-2012.

	Year	Effort (minutes)	AGE 0	1	2	3
Inner Bay	1980	130	167 8	198.5	142.1	134.5
	1981	220	534.9	231 0	55.2	20.2
	1982	400	1026.8	176.2	34.7	41.3
	1983	220	125.9			
	1984	400	761.7	44.5	57.7	35 5
	1985	480	20.8	125.5	64.1	43 6
	1986	400	1859.5	61.7	192.3	39.2
	1987	400	3.8	39.7	2.6	15.5
	1988	400	305.0	2.9	41.4	1.9
	1989	400	457.7	84.6	29.4	114.3
	1990	400	202.6	21.0	46.2	4.6
	1991	400	144 0	24.5	14.5	17.3
	1992	400	594 0	32 8	6.9	1.3
	1993	400	239.8	17 9	11 9	2.2
	1994	400	84.0	29.8	10.3	13.0
	1995	400	5 3	54.3	20.5	2.1
	1996	400	53 6	6.1	22.4	9.9
	1997	400	21.5	5.4	5.0	11.9
	1998	480	1005.9	14.9	10.7	1 0
	1999	480	34.0	155.7	25.8	11 0
	2000	400	1.2	4.8	107.0	6.0
	2001	400	463.8	2.7	13.0	18.1
	2002	400	8.3	42.6	8.8	10.4
	2003	320	224.0	1.5	8.5	0.7
	2004	480	0.1	21.4	2.8	2.6
	2005	480	8.8	0.2	10.9	0.6
	2006	400	0.3	4.8	1.4	4.0
	2007	400	73.9	3.0	7.0	2.3
	2008	400	0.3	4.1	0.1	0.0
	2009	320	0.0	0.0	0.0	0.0
	2010	400	5.7	0.6	1.6	3.6
	2011	400	3.9	12.8	2.6	1.7
	2012	400	1.6	1.7	1.4	0.0
	Avg. for 1980-2011		263.7	46.0	30.9	18.4
Outer Bay	1980	209	21.1	61.5	23.8	22.0
	1981	200	137.4	5.0	5.1	0.8
	1982	200	69 6	22.6	6.9	5 8
	1983	0				
	1984	300	283.9	9.7	2.7	1.8
	1985	360	2.4	32 6	14.0	3.5
	1986	300	102.0	0.2	30 7	3.1
	1987	300	3.4	284.1	15.7	89.3
	1988	280	667.7	0.8	52.4	10 6
	1989	240	296.9	53.2	26.6	84 5
	1990	300	43.3	12.0	28.8	4.6
	1991	299	15.5	1.0	0.5	0.9
	1992	300	54.3	9.0	1.2	0.5
	1993	240	21 6	4.5	2.4	0.2
	1994	240	159.8	15.3	11.2	2.4
	1995	300	6.0	33.7	14.3	3.6
	1996	300	199.1	2.6	4.5	1.3
	1997	300	18.9	59.8	3.1	3.7
	1998	300	114.9	1.2	0.6	0.3
	1999	300	2 5	69.5	1.3	1.0
	2000	300	10.2	2.1	13.9	0.2
	2001	300	76 7	2.0	3.0	5.3
	2002	300	0.6	13.9	1.7	5.9
	2003	240	93.3	0.8	7.9	0.2
	2004	360	0.5	4.3	0.6	1.3
	2005	360	10.3	0.1	6.9	0.3
	2006	300	2.8	1.4	0.2	1.2
	2007	300	6.3	0.9	0.6	0.0
	2008	300	4.9	6.6	1.1	0.6
	2009	240	1.5	4.2	5.5	0.0
	2010	300	13.2	0.6	0.2	1.5
	2011	300	3.9	1.9	0.2	0.2
	2012	300	11.3	1.1	0.2	0.0
	Avg. for 1980-2011		78.9	23.1	9.3	8.3

Table 4.3.5 Relative abundance (mean number per hectare) of Rainbow Smelt at ages 0 to 2 and yearling-and-older (YAO) caught with a 10 m bottom trawl in the offshore waters of Outer Long Point Bay, Lake Erie, October 1984-2012.

Year	Effort (minutes)	Age Group			
		0	1	2	YAO
1984	320	2206.3	15.1	8.1	29.8
1985	394	84.0	397.8	11.8	409.6
1986	380	2979.8	32.0	356.3	398.8
1987	440	267.6	3159.0	168.8	3328.1
1988	480	972.8	25.4	72.0	99.1
1989	400	1158.4	620.1	2.6	622.6
1990	400	1194.3	437.5	191.2	633.4
1991	400	54.4	514.5	0.4	649.4
1992	400	1468.8	26.6	68.2	97.2
1993	400	203.6	1395.9	76.8	1477.9
1994	400	341.9	6.5	2.2	8.8
1995	400	84.0	272.9	42.3	347.8
1996	240	353.2	16.4	1.6	18.2
1997	400	154.4	168.4	14.1	188.5
1998	400	422.5	9.9	13.7	25.1
1999	310	40.3	137.1	33.6	140.1
2000	400	259.9	21.7	7.0	29.1
2001	400	2633.3	663.0	29.0	692.8
2002	400	142.5	3.5	1.9	5.9
2003	400	7058.1	165.7	32.5	205.8
2004	400	132.2	495.8	61.5	565.6
2005	400	0.9	3.7	2.9	7.6
2006	400	1256.0	28.9	40.8	136.2
2007	400	991.3	214.0	9.1	232.8
2008	400	1293.0	48.7	25.6	77.3
2009	400	148.2	1551.6	91.5	1654.3
2010	400	326.9	106.0	112.0	222.7
2011	400	509.2	249.4	27.1	277.1
2012	400	1657.7	302.1	61.3	367.8
Avg. for 1984-2011		954.9	385.3	53.7	449.3

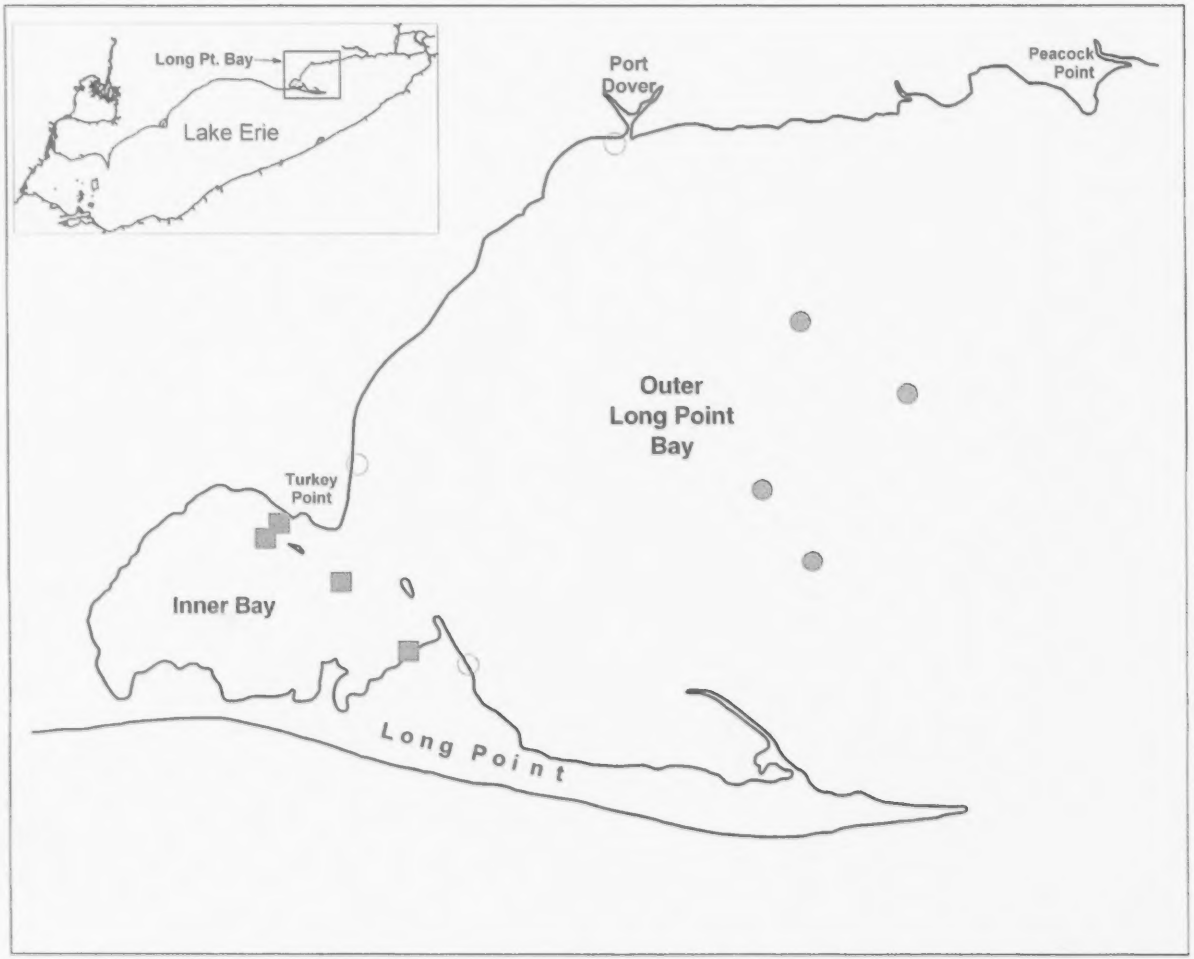

Figure 4.3.1 Location of trawl stations where bottom trawling was conducted in Inner Bay (■), and the nearshore (o) and offshore (•) waters of Outer Long Point Bay, Lake Erie.

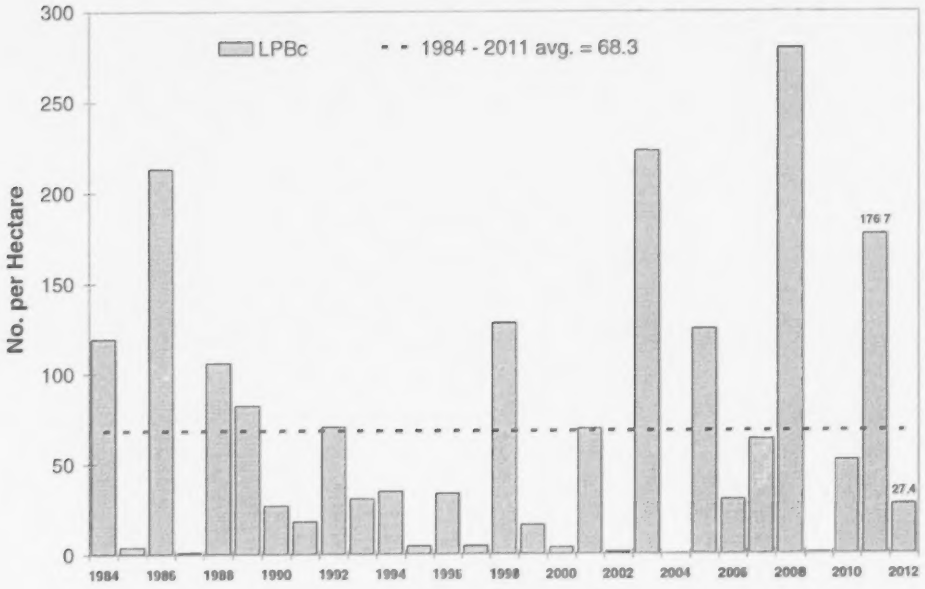

Figure 4.3.2 Relative abundance (mean number per hectare) of Age 0 Yellow Perch from a composite index (LPBc) of three bottom trawl assessments in Long Point Bay, Lake Erie, during September - October, 1984-2012.

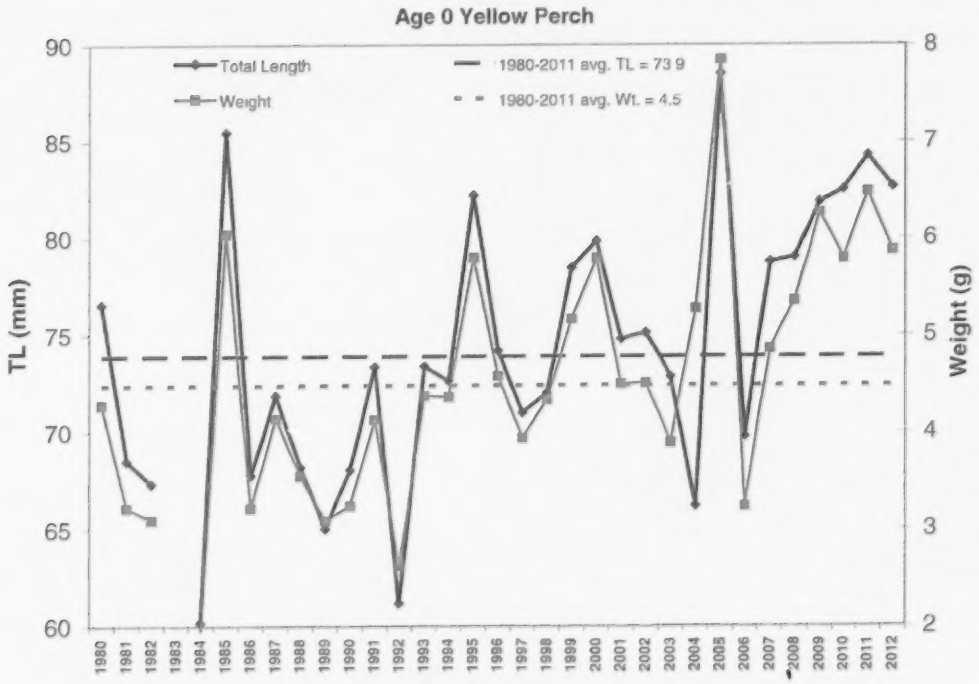

Figure 4.3.3 Mean total length (mm) and weight (g) of Age 0 Yellow Perch from 6.1 m index trawl catches in the inshore waters of Long Point Bay (Inner and Outer Bays combined), Lake Erie, 1980-2012 (September data). No fish sampled in 1983.

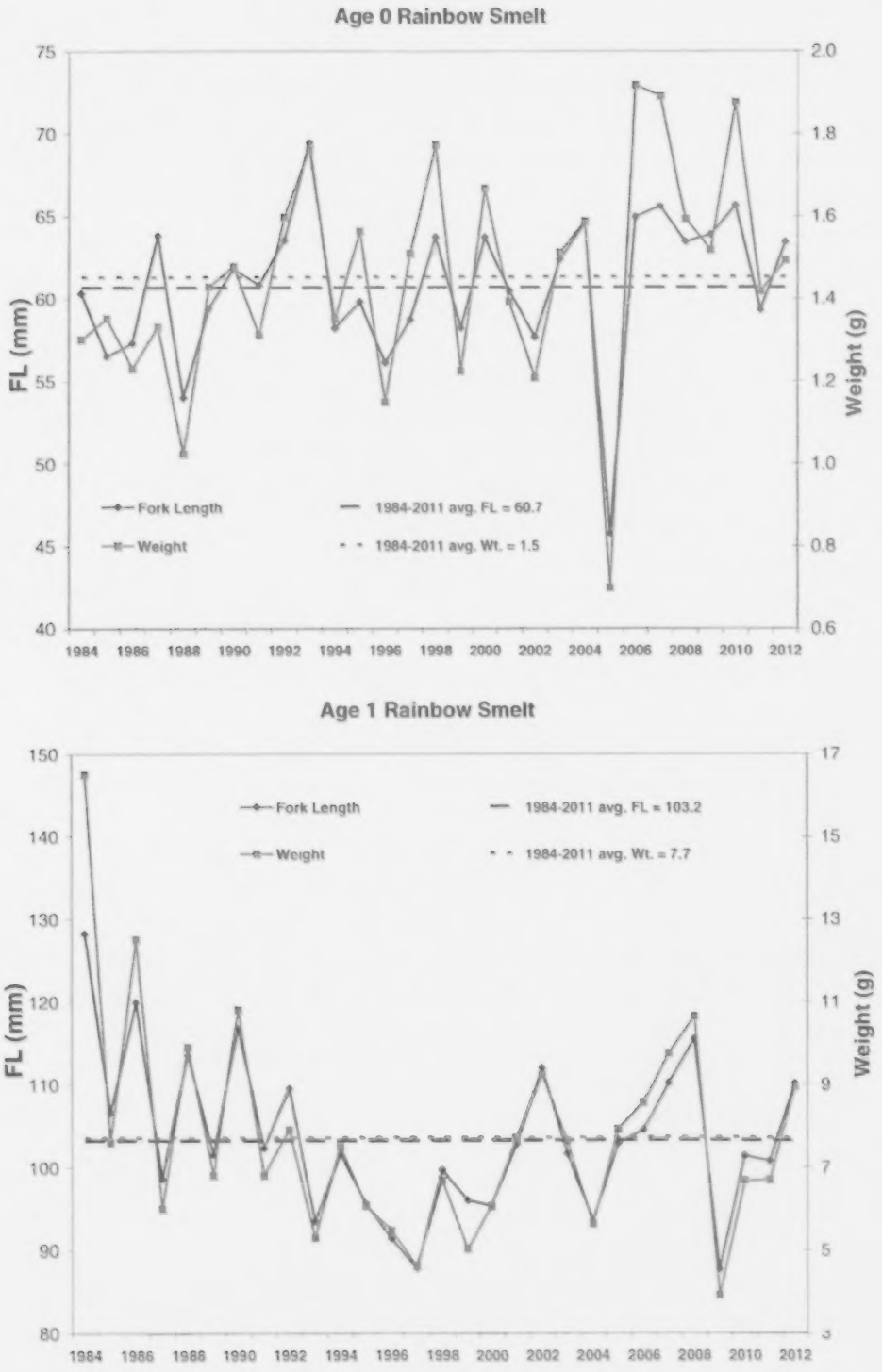

Figure 4.3.4 Mean fork length (mm) and weight (g) of Age 0 (top graph) and Age 1 (bottom graph) Rainbow Smelt from 10 m index trawl catches in the offshore waters of outer Long Point Bay, Lake Erie, 1984-2012 (October data).

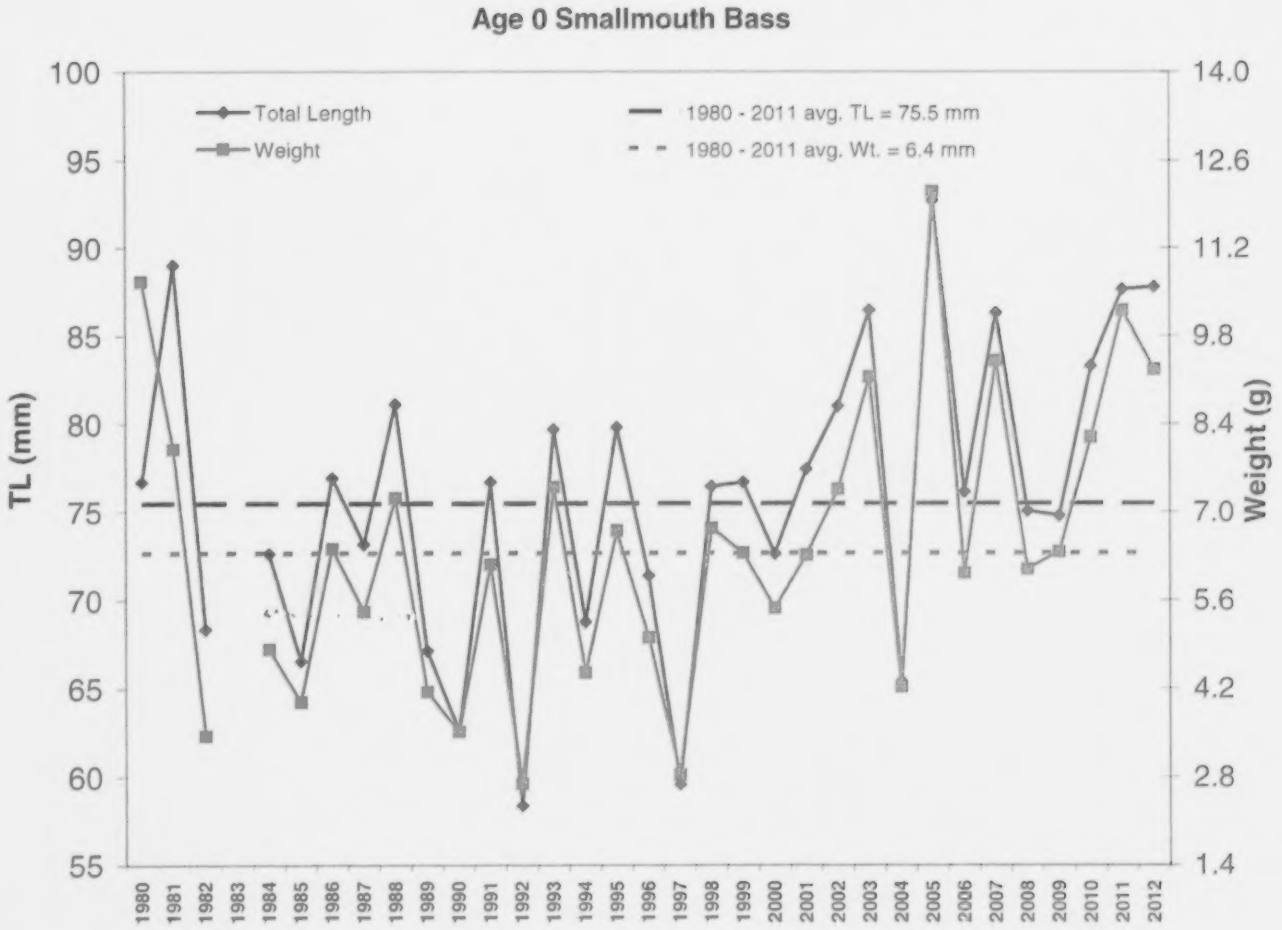

Figure 4.3.5 Mean total length (mm) and weight (g) of Age 0 Smallmouth Bass from 6.1 m index trawl catches in Inner Bay of Long Point Bay, Lake Erie, 1980-2012 (September data). No fish sampled in 1983.

4.4 Long Point Bay Nearshore Fish Community Survey

A gill net survey has been conducted annually in Long Point Bay since 1986 to monitor the composition of the fish community, and describe the abundance and biological characteristics of important sport and commercial species over time. Between 1991 and 1994, the program was expanded to include comparisons of the effectiveness of multifilament gear (used 1986-1994) and monofilament gear (used since 1991). The later gear type has been used in the commercial fishery and, more recently, in agency gillnet assessment programs on Lake Erie. Comparisons of catches between monofilament and multifilament nets were completed in 1996, and species specific conversion ratios were computed. Species catches from multifilament nets (pre 1991) were adjusted to comparable efficiency of monofilament nets (by conversion ratio multipliers) to describe trends in abundance of major species across the entire time series (1986-2012). Monofilament nets have been used exclusively in this survey since 1995.

Study Area and Sampling Design

The standardized study area encompass the waters within outer Long Point Bay, extending from the minimum depth (12 ft.) that the gear could be set, to the depth of the 30 ft. contour (Figure 4.4.1). The bay was partitioned into three sampling areas, then further partitioned into sampling grids (0.5 X 0.5 nautical miles), and 2 depth strata (12-18 ft., >18-30 ft.). Areas 1, 2 and 4 have been sampled each year since 1986. The survey period was from spring to fall during 1986 to 1993. This was reduced to June - August for the years 1994 and later. Only data from a comparable time period (June - August) for the entire time series (1986-2012) are reported below.

An additional depth stratum was sampled on an exploratory basis starting in 2011 and continued in 2012 to examine the distribution and abundance of fish species, Yellow Perch in particular, in deeper offshore waters of Long Point Bay representing previously unsampled fish habitat. This extra deep stratum extended sampling from the 30 ft. (9.1 m) contour to the 66 ft. (20 m) contour and increased by approximately 90% the number of potential sample grids and the overall surface area of the Long Point Bay study area (Figure 4.4.1). An additional 20 sites were sampled with the standard index gillnet gangs in the extra deep stratum, bringing the total number of gillnet sets to 60 during each of the 2011 and 2012 surveys. The findings from sampling the extra deep stratum (in 2012) are reported in Table 4.4.2.

Areas were sampled weekly on a rotational basis. Six grid locations (two per depth stratum) were chosen randomly within each sampling area to establish netting sites. A monofilament net composed of single 50 foot panels of mesh sizes 1.25, 1.5 and 1.75" (stretched mesh) and 2 panels each of mesh sizes 2, 2.25, 2.5, 2.75, 3, 3.5, 4, 4.5, 5, 5.5 and 6" was set at each location. The total length of monofilament gang was 1250 ft. (381 m). Observed numbers and biomass (weight in grams) of fish species catches in the 1.25, 1.5 and 1.75" mesh size panels were doubled to standardize catch to an equivalent 100 ft. panel length. Species CUE's as number per km and weight (biomass, grams) per km of net were calculated from the total catch in gangs excluding the catch in 5.5 and 6" mesh sizes.

Fish Community

Catch (all mesh sizes) by species from 1995 to 2012 are summarized in Table 4.4.1. Yellow Perch, normally the most abundant (in number) species, represented only 19% of all fish species caught during the 2012 survey. Alewife was the most captured fish species in 2012 accounting for 42% of

the total catch in number. Alewife abundance in Long Point Bay has been episodic, accounting for approximately half of the total fish species catch in some years (1995, 1998, 2002, 2006) and almost nothing in other years (1996, 1997, 2004, 2011). Gizzard Shad also was abundant in 2012 contributing 17% of the numeric fish catch. Smallmouth Bass (11.6%), Freshwater Drum (2.8%), White Perch (1.6%), and Rock Bass (1.3%) contributed the next highest numbers of fish species caught (Table 4.4.1).

Table 4.4.2 summarizes species catch by depth strata and includes fish captured during supplementary sampling of the extra deep stratum (>30-66 ft.) in 2012. Three depth strata were sampled equally in 2012 with 20 sets each. Total species catch and composition varied with depth strata (Table 4.4.2). Twenty-five fish species totaling 6,708 individuals were caught in the shallowest stratum (12-18 ft.) compared to 21 species totaling 3,763 fish and 16 species totaling 3,590 fish in the >18-30 ft. and >30-66 ft. depth strata, respectively. Alewife, the most abundant species captured overall comprised 43, 39, and 29% of the total catch by depth strata from shallowest to deepest, respectively (Table 4.4.2). Several other species exhibited decreased abundance with greater depth. These included White Bass, Freshwater Drum, Rock Bass, Gizzard Shad, Redhorse Sucker, Northern Pike, Quillback, Common Carp, Smallmouth Bass and Pumpkinseed. Longnose Gar, Bowfin and Burbot were only captured in the shallowest stratum. Catches of Lake Trout, Rainbow Smelt, and Round Goby increased with depth strata; 39 of 46 total Lake Trout captured were taken in the >30-66 ft. stratum. Twice as many Walleye were captured in the shallowest stratum compared to the other two depth strata. Yellow Perch catches in 2012 were highest in the extra deep stratum and lowest in the middle depth stratum in contrast to the previous year when Yellow Perch abundance decreased with increased depth (Table 4.4.2).

Trends in Abundance, Biomass and Growth of Yellow Perch 1986-2012

Yellow Perch were abundant in Long Point Bay during the late 80's (Figure 4.4.2). Population size decreased precipitously during the early 1990's and remained at low levels throughout the decade until 2000, when two year old Yellow Perch from the strong 1998 year class began to recruit into the population. The 1998 year class remained the dominant cohort of index gill net catches, contributing 88, 86, 70, and 41% of the annual survey total Yellow Perch catch (in number) in successive years from 2000 to 2003. In 2002, the year of highest Yellow Perch abundance, the 1998 year class accounted for 70 and 74% of the total Yellow Perch catch in number and biomass, respectively. In 2012, Yellow Perch abundance decreased in number (22.8%) and biomass (29%) to the lowest level observed since 1999 (Figure 4.4.2). Age 2 fish from the 2010 year class accounted for 45% of the total number and 29% of the total biomass of Yellow Perch caught in index nets in 2012. Age 5 fish (2007 year class) represented only 20% of the total catch in number and 32% of the Yellow Perch biomass (Figure 4.4.2).

Yellow Perch mean size at age has increased over the survey's time series (Figure 4.4.4). A more recent trend of decreasing size at age is evident in age 4 and 5 Yellow Perch after 2001 to about 2008. The 2004 year class of Yellow Perch was assessed as being relatively weak in trawl surveys (Tables 4.3.1 to 4.3.3), and surviving members appear to have experienced rapid growth to age 3 in 2007, attaining a mean size similar to age 4 Yellow Perch from the very abundant 2003 year class. In 2008, ages 3, 4 and 5 Yellow Perch cohorts from the 2005, 2004 and 2003 year classes were all similar in size with estimated mean total length of 210, 210 and 215 mm, respectively (Figure 4.4.4). In 2009, ages 4 to 7 Yellow Perch cohorts from the 2002 to 2005 year classes were all between 240 and 256 mm mean total length. In 2010, only a few millimeters separated the mean lengths of ages 5 (256 mm TL), 6 (268 mm) and 7 (271 mm) Yellow Perch. In 2011, ages 2, 4, 5, and 7 Yellow Perch exhibited small to moderate decreases in mean size (Figure 4.4.4). In 2012, ages 2, 3, 4, and 7

Yellow Perch all exhibited increased growth and age 2 and 3 Yellow Perch were the largest observed in the Long Point Bay time series (Figure 4.4.4).

Trends in Abundance, Biomass and Growth of Smallmouth Bass 1986-2012

Catch rates of Smallmouth Bass in Long Point Bay index gill nets have ranged between 20 to 50 Smallmouth Bass per km during most of the survey years between 1986 and 2003, indicating a relatively stable and healthy population during this time period (Figure 4.4.3). Comparatively low Smallmouth Bass abundance in 1998 was followed by a period of yearly increases that peaked in 2003 at 47 bass/km. Numeric abundance and biomass of Smallmouth Bass decreased sharply in 2004 and again in 2005. The abundance trend reversed again in 2006 with consecutive year increases that peaked in 2007 at near record high mean numbers and biomass with an unexpected large contribution (56%) of age 2 Smallmouth Bass (Figure 4.4.3), a surprising observation considering that full vulnerability to the gear does not occur until age 3. The 2005 year class has continued to dominate the annual total Smallmouth Bass catch through 2008 (79%), 2009 (59%), and 2010 (32%). In 2012, the 2005 year class (age 7) remained an important contributor to the total biomass of Smallmouth Bass at 13.2%, while representing only 6.4% of the total catch in number (Figure 4.4.3). Age 4 Smallmouth Bass from the 2008 year class dominated the 2012 catch in number (36% of total) and biomass (40% of total).

Smallmouth Bass size at ages 2 through 7 has increased since the late 90's (Figure 4.4.5). All of these age groups remained above average size in 2012 (Figure 4.4.5).

Table 4.4.1 Total numbers of each fish species caught in monofilament nets during the Long Point Bay Index Gill Netting Survey, 1995-2012. Numbers include catch in all mesh sizes (14 mesh sizes from 32 to 152 mm) standardized to 40 sets for comparison.

Species	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
Longnose Gar	85	31	159	5	260	30	5	0	0	28	31	161	10	6	12	61	0	33
Bowfin	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	3
Alewife	6,169	7	3	4,215	1,070	5,809	28	19,339	12	2	24	7,776	61	22	0	96	36	4,371
Gizzard Shad	56	47	114	19	185	531	81	503	227	122	60	483	447	104	53	452	80	1,788
Pink Salmon	0	0	0	0	2	0	0	1	0	1	0	0	0	0	0	0	0	0
Rainbow Trout	1	1	2	5	1	0	0	0	6	0	0	2	2	1	0	1	2	2
Atlantic Salmon	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Brown Trout	4	3	3	7	1	0	2	2	6	1	1	0	9	5	1	5	4	2
Lake Trout	0	1	0	1	0	0	0	0	0	2	1	2	0	0	0	5	7	7
Lake Whitefish	0	1	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
Rainbow Smelt	1	0	9	0	0	0	12	0	0	20	13	3	20	26	72	27	7	4
Northern Pike	5	1	9	7	47	6	7	7	19	10	1	2	4	6	6	9	4	6
Mooneye	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Quillback	18	0	22	8	8	12	2	5	24	16	3	10	11	9	9	46	28	24
White Sucker	151	133	163	199	334	141	122	95	150	92	149	41	61	59	54	93	78	49
Northern Hog Sucker	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0
Redhorse Sucker	98	40	27	51	62	41	62	21	36	22	27	13	26	13	11	13	5	13
Common Carp	11	1	0	10	3	6	10	5	11	8	0	12	11	3	5	7	3	7
Golden Shiner	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0
Emerald Shiner	0	0	0	0	0	5	0	0	0	0	2	0	0	0	0	0	0	0
Spottail Shiner	0	0	4	0	0	2	4	2	0	2	2	2	0	0	0	0	0	0
Yellow Bullhead	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1	0	0	0
Brown Bullhead	4	9	1	2	36	0	1	12	24	81	35	32	50	36	53	69	75	87
Channel Catfish	0	0	7	5	1	5	1	0	2	2	1	3	0	2	4	0	0	5
Stonecat	8	6	10	4	3	19	15	3	0	0	0	0	0	0	0	0	0	0
Burbot	1	26	10	22	19	33	5	1	0	0	0	0	0	0	0	0	0	5
Trout-perch	0	0	0	0	0	2	0	2	0	2	0	0	2	0	0	2	2	0
White Perch	26	11	83	7	52	58	31	73	58	103	42	60	59	54	118	278	253	168
White Bass	21	4	37	3	26	16	2	19	42	11	4	50	34	19	19	71	38	90
Rock Bass	794	470	380	264	640	291	201	81	151	69	151	219	136	104	174	123	148	135
Pumpkinseed	85	41	52	139	62	5	16	2	7	3	9	9	25	5	2	12	1	54
Bluegill	11	514	2	4	1	0	1	0	0	0	0	0	3	2	0	2	0	0
Smallmouth Bass	910	514	742	293	427	485	509	428	702	181	132	376	1,129	791	396	1,045	934	1,209
Black Crappie	5	1	6	5	2	0	1	0	0	0	0	0	0	0	0	0	0	0
Yellow Perch	2,316	1,320	1,404	1,577	2,083	7,134	9,633	11,134	7,233	7,625	7,359	7,183	5,389	3,145	4,989	3,120	2,698	2,033
Walleye	16	11	20	4	14	3	4	5	27	40	23	18	13	31	23	78	30	35
Round Goby	0	0	0	0	8	68	708	2,399	424	391	134	275	172	222	89	47	70	48
Freshwater Drum	569	539	577	472	412	270	225	256	537	240	150	170	495	263	282	698	254	293
Totals	11,369	3,736	3,847	7,328	5,764	14,973	11,688	34,395	9,698	9,074	8,355	16,902	8,169	4,930	6,373	6,360	4,757	10,471
Actual Number of Sets	32	28	36	40	40	44	40	40	36	40	40	40	40	40	40	40	40	40

Table 4.4.2 Total numbers of each fish species caught by depth strata in monofilament nets during the Long Point Bay Index Gill Netting Survey, 2012. Numbers include catch in all mesh sizes (14 mesh sizes from 32 to 152 mm) standardized to 20 sets per depth strata.

Species	Depth Stratum			Total
	12-18 ft (3.7-5.5 m)	>18-30 ft (>5.5-9.1 m)	>30-66 ft (>9.1-20 m)	
Longnose Gar	33	0	0	33
Bowfin	3	0	0	3
Alewife	2899	1472	1043	5414
Gizzard Shad	973	815	34	1822
Rainbow Trout	2	0	1	3
Brown Trout	1	1	3	5
Lake Trout	1	6	39	46
Rainbow Smelt	3	1	36	40
Northern Pike	5	1	0	6
Quillback	21	3	0	24
White Sucker	31	18	36	85
Redhorse Sucker	10	3	2	15
Common Carp	5	2	0	7
Brown Bullhead	85	2	0	87
Channel Catfish	4	1	0	5
Burbot	5	0	0	5
White Perch	82	86	44	212
White Bass	63	27	9	99
Rock Bass	103	32	6	141
Pumpkinseed	48	6	0	54
Smallmouth Bass	696	513	105	1314
Yellow Perch	1410	623	2112	4145
Walleye	24	11	12	47
Round Goby	18	30	79	127
Freshwater Drum	183	110	37	330
Total catch (No.)	6708	3763	3598	14069
No. species	25	21	16	25
No. gillnet sets	20	20	20	60

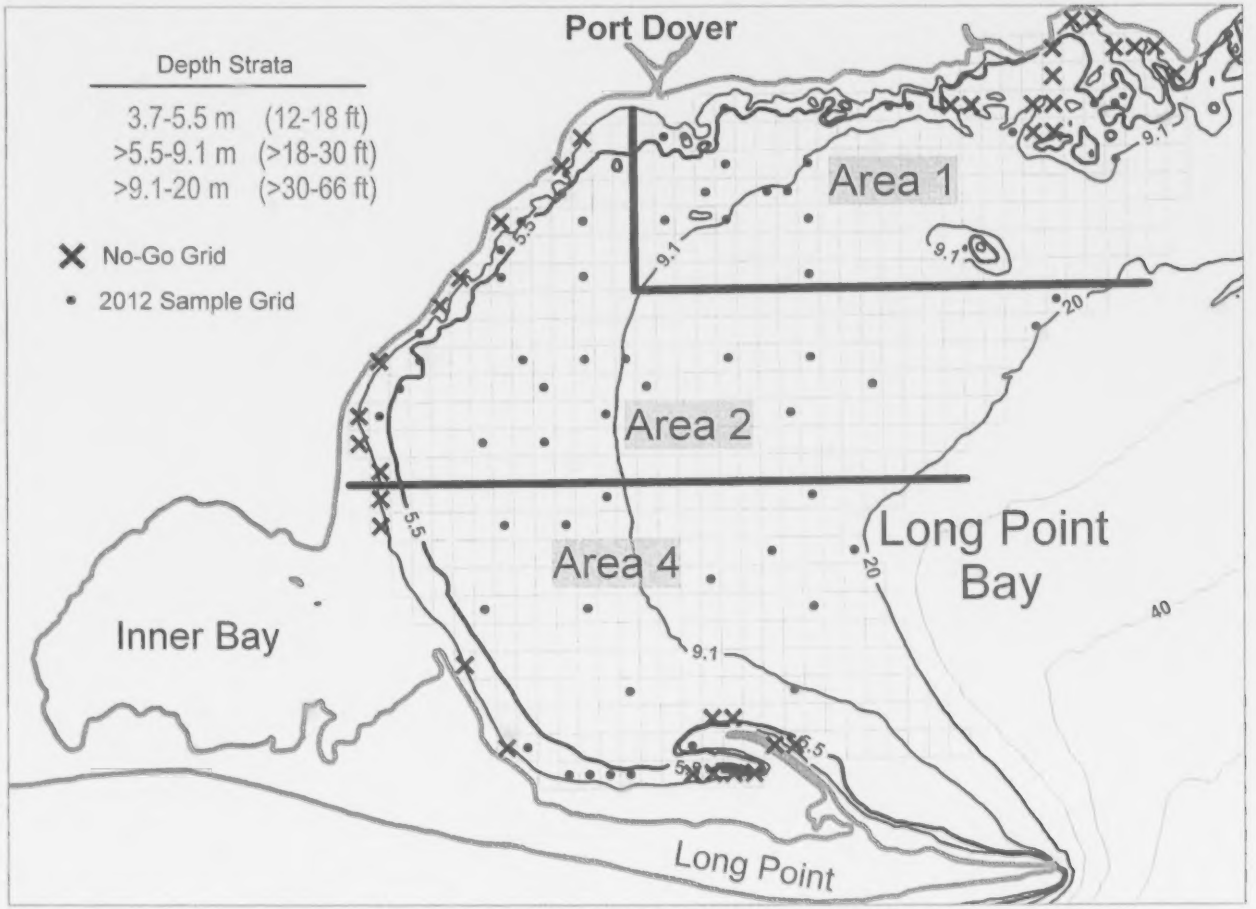

Figure 4.4.1 Long Point Bay gill net assessment study area showing potential sample grids by spatial (Areas 1, 2, and 4) and depth strata. Grids sampled in 2012 and grids considered unfishable are indicated. The standard study area encompass sample grids in the 12-18 ft. (3.7-5.5 m) depth stratum and the >18-30 ft. (>5.5-9.1 m) depth stratum. An additional deeper depth strata extending from the >30 to 66 ft. (>9.1-20 m) depth contour was sampled on a supplementary basis during 2011 and 2012.

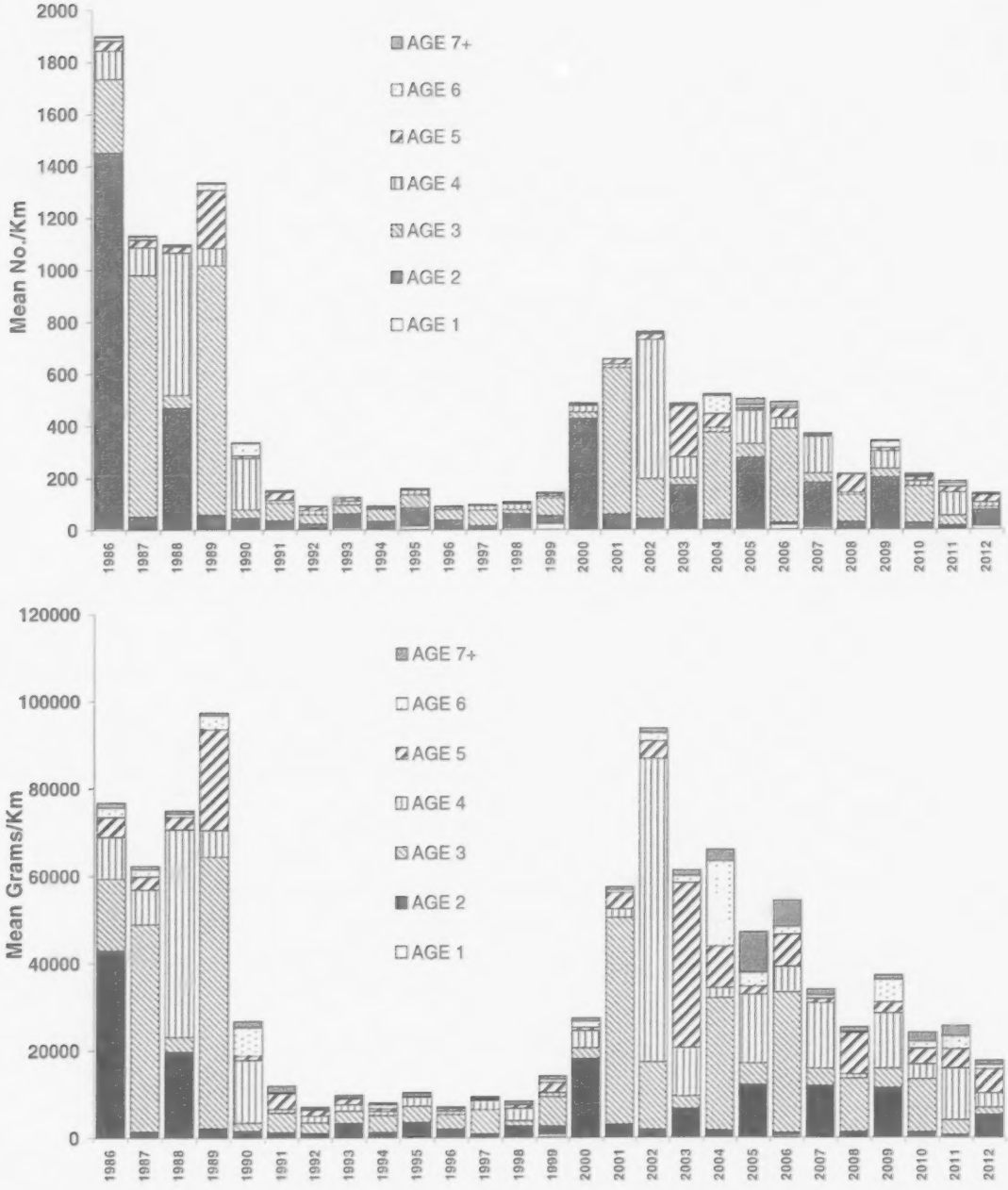

Figure 4.4.2 Catch at age of Yellow Perch in Long Point Bay Index gill nets set overnight at 18-30 ft. depths during June - August, 1986-2012. Catch reported in Arithmetic Mean Number per Kilometre (top graph) and Arithmetic Mean Weight (g) per Kilometre (bottom graph). Age 7 and older Yellow Perch combined.

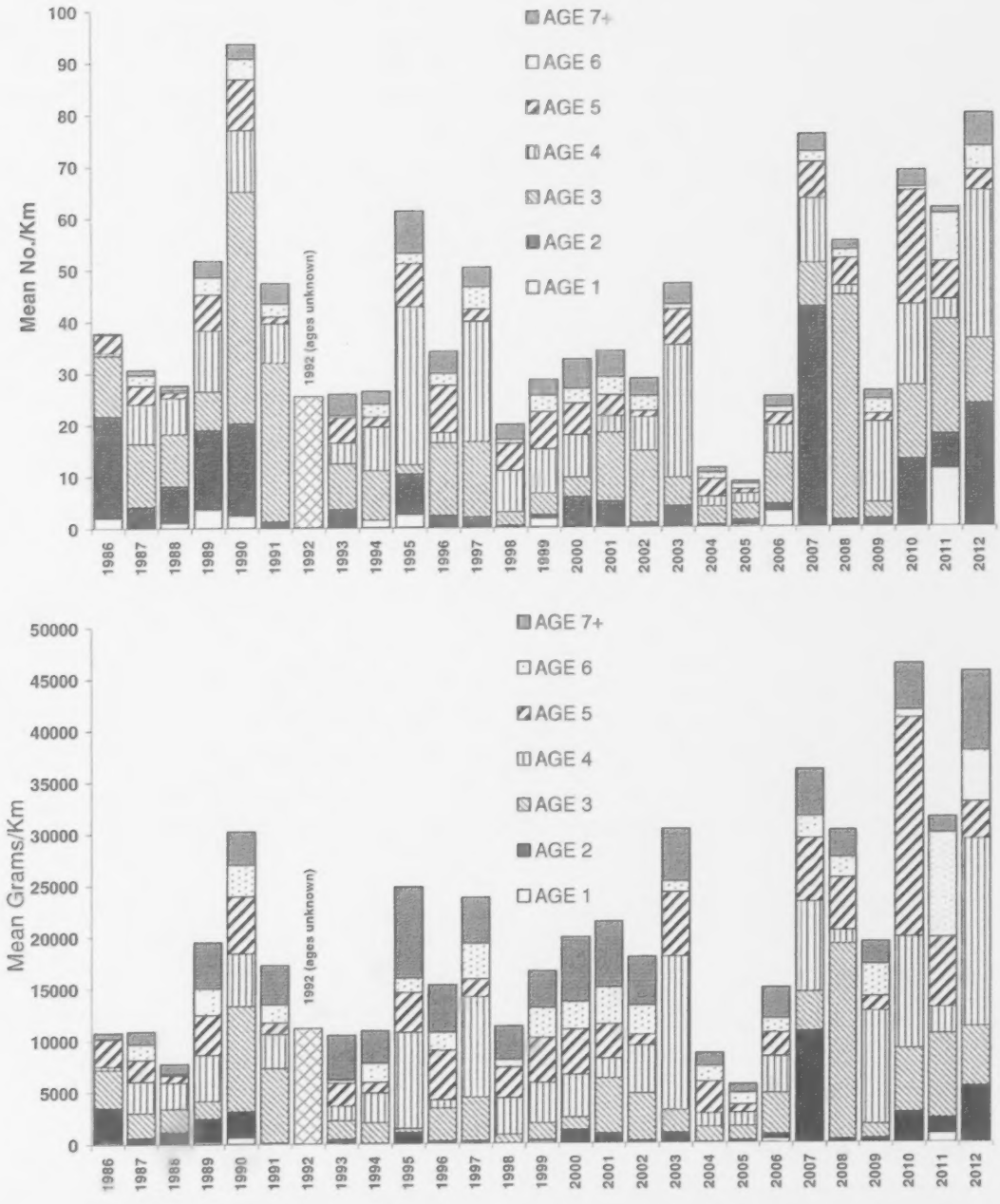

Figure 4.4.3 Catch at age of Smallmouth Bass in Long Point Bay Index gill nets set overnight at 18-30 ft. depths during June - August, 1986-2012. Catch reported in Arithmetic Mean Number per Kilometre (top graph) and Arithmetic Mean Weight (g) per Kilometre (bottom graph). Age 7 and older Smallmouth Bass combined.

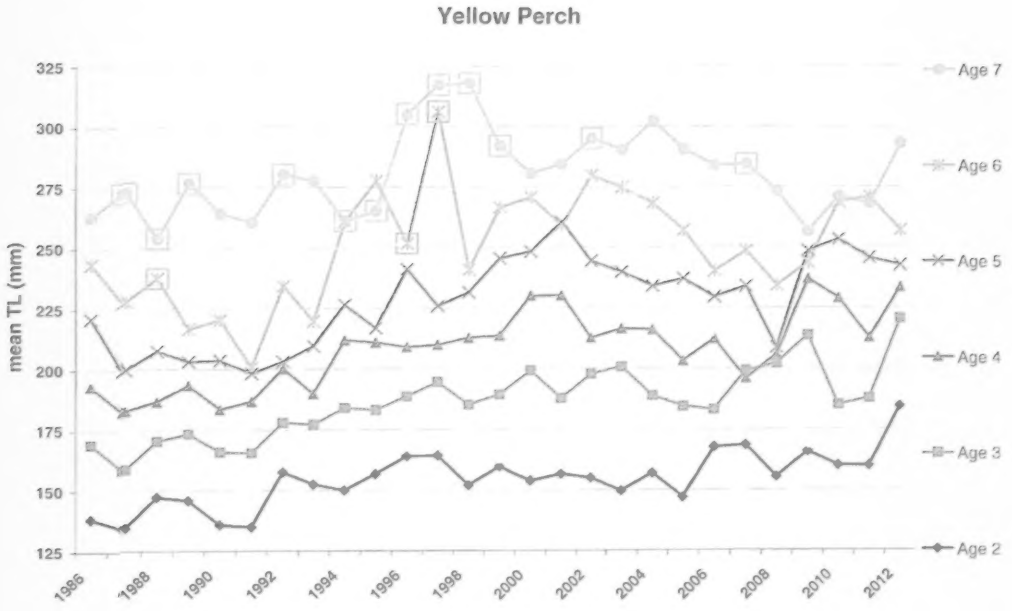

Figure 4.4.4 Yellow Perch mean total length (mm) at ages 2 to 7 in Long Point Bay Index gill nets set overnight at 18-30 ft. depths during June - August, 1986-2012. Males and females combined. Mean values outlined with a box were estimated from N < 10 samples.

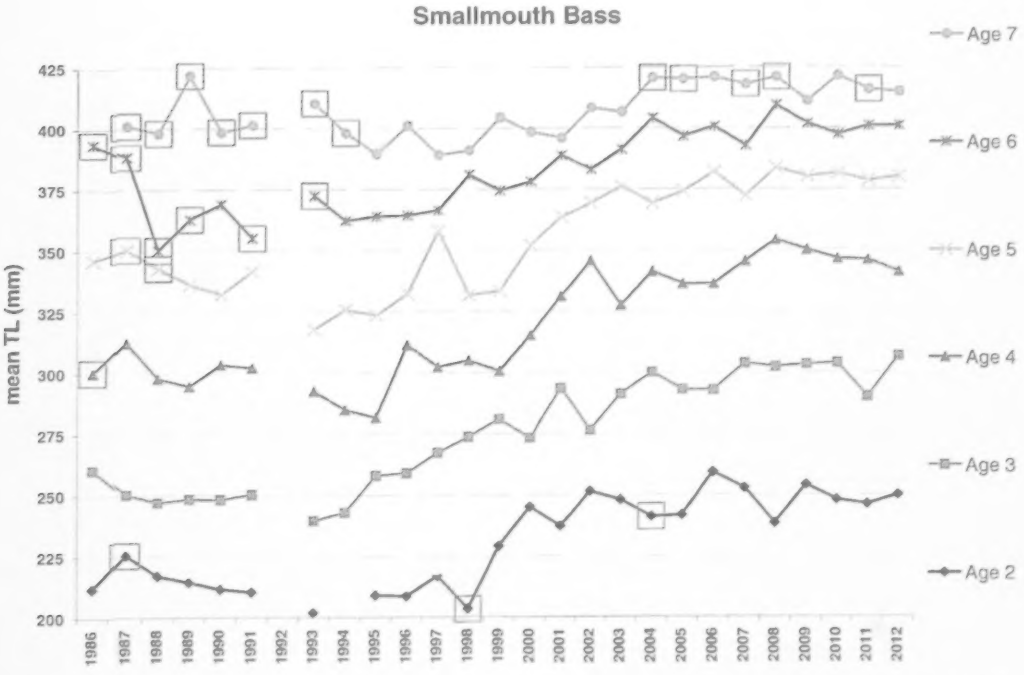

Figure 4.4.5 Smallmouth Bass mean total length (mm) at ages 2 to 7 in Long Point Bay Index gill nets set overnight at 18-30 ft. depths during mid-June to mid-September, 1986-2012. Males and females combined. Mean values outlined with a box were estimated from N < 10 samples. Smallmouth Bass ages were not available for 1992 samples.

5. FISHERIES MANAGEMENT PROJECTS

5. 1 Western Basin Smallmouth Bass Spawning Study

The timing of Smallmouth Bass spawning is closely related to water temperature. Smallmouth Bass are mainly inactive during the winter. Smallmouth Bass become active after the water temperature rises above 10°C, and males begin to build their nests. Egg deposition occurs between 12.8 – 20.0°C, mainly occurring between 16.1-18.3°C (Scott and Crossman, 1998). Witzel (1989) observed that initiation of Smallmouth Bass spawning in Long Point Bay, Lake Erie was consistent with water temperatures ≥15°C. LEMU completed a field study in 2012 to confirm the relationship between Smallmouth Bass spawning dates and water temperatures in the western basin of Lake Erie.

The study occurred between May 1 and June 12. Gill nets were set at two locations in the western basin of Lake Erie near Pelee Island (Figure 5.1.1.).

Site 1 - West Pelee Island, approximately 4146.48, -8241.55 (DDMM.MM)
Site 2 - Sheridan Point, approximately 4149.19, -8241.04 (DDMM.MM)

Nets were 350 feet long, consisting of seven 50 ft panels with mesh sizes from 3" to 6" (76 mm to 152 mm) in half inch increments. Mesh sizes were placed in a random order (3", 5", 4", 6", 4½", 5½", 3½"). Nets were retrieved after one night of fishing. At each site temperature and dissolved oxygen were recorded at every 1 m depth. All fish were bagged according to mesh size, site and date, and returned to the lab for sampling. In the lab, all species were counted and weighed in bulk by mesh size and site. All Walleye were measured for total length, fork length, round weight, sex, and gonad condition. All Smallmouth Bass were measured for total length, fork length, round weight, sex, gonad condition and ovary weight. Female Smallmouth Bass may spawn more than once, and fish with eggs that were not freely running were labelled "pre-spawning" whether or not they had already spawned. Female Smallmouth Bass with eggs running freely were labelled "spawning". Due to the residual quantities of eggs present no females could be classified as "spent".

Between May 1 and June 12, there were 6 sampling events at each of the two locations. The mean water temperature at the two sites was 10.6°C during the first week of the study (May 1, 2012) and increased to 22.0°C by the last week of the study (Table 5.1.1).

In total 794 fish were caught representing 14 different species (Table 5.1.2). The most abundant species was Gizzard Shad, which accounted for 61% of the catch. Thirty-nine Walleye were caught during the study. Walleye ranged in age from 2 to 12, the mean age was 6.7. Forty-five percent of the Walleye were age 9 (2003 year class).

Eighty-nine Smallmouth Bass were caught during the study. Ages ranged from 3 to 17 (Table 5.1.3), the mean age was 7.3. All female fish caught were mature. During the first week of the study all females were gravid and eggs were not running. Females in spawning condition (with eggs running freely) were encountered during the weeks of May 12, May 24, and May 29 (Table 5.1.4). No spawning females were observed after May 29.

During the first week of the study, when female fish were gravid, the mean GSI (gonad weight / round weight) was 8%. The maximum GSI observed was 12%. The GSI decreased during the study to 4% by the last week (Table 5.1.5, Figure 5.1.2). The lowest observed GSI was 2% on June 12; eggs in this fish appeared to be resorbing (atresia). Females spawning during the week of May 29 had lower GSI values than females spawning during the week of May 17. This implies that females spawning during that week may have been spawning for the second time.

Since female Smallmouth Bass may spawn more than once, and can retain eggs after spawning, it is difficult to assess gonad condition precisely. Females that have not spawned will have eggs, and so will females that have already spawned. In this case, spawning condition may be inferred from GSI.

In this study, female Smallmouth Bass that had not spawned (May 1) had GSI values around 8%. Females that had completed spawning had average GSI values around 4%.

Observations indicate that spawning started around May 17 when the temperature was approximately 15.7°C and ended after May 29 when the temperature was around 20.6°C.

Depending on water temperature, Smallmouth Bass eggs hatch within 4 to 10 days; it takes 12 more days for the young to absorb the yolk sac and rise off the bottom; 5 to 7 days later they leave the nest. Males continue to guard the young for several days after they have left the nest (Scott and Crossman, 1998). Guarding by males generally ceases when the young disperse (Scott et al, 1997). During the last week of the study males accounted for only 10% of the Smallmouth Bass catch, compared to 66% of the catch during the first week of the study. This suggests that some males were still guarding fry on June 12. It is expected that males will guard dispersing fry over a 3 day period, making the total period of paternal care span from 24 to 32 days. The estimated range of dates for males guarding bass fry in western Lake Erie sites during 2012 extends from June 9 to June 29.

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Table 5.1.1 Mean temperature of sampling locations by date in the western basin Smallmouth Bass spawning survey.

Date	Average Temperature (°C)
May 1, 2012	10.6
May 17, 2012	15.7
May 24, 2012	16.9
May 29, 2012	20.6
June 6, 2012	18.9
June 12, 2012	22.0

Table 5.1.2 Number of fish caught by species and site in the western basin Smallmouth Bass spawning survey.

Species	Number of Fish Caught		Total
	Site 1	Site 2	
Longnose Gar	2		2
Gizzard Shad	212	270	482
Quillback	2		2
White Sucker	3	3	6
Silver Redhorse		1	1
Shorthead Redhorse	6	6	12
Channel Catfish	9	6	15
White Perch	19	53	72
White Bass	13	20	33
Rock Bass	4	4	8
Smallmouth Bass	41	48	89
Yellow Perch	1	3	4
Walleye	19	20	39
Freshwater Drum	16	13	29
Total	347	447	794

Table 5.1.3 Number of Smallmouth Bass caught by age and sex in the western basin Smallmouth Bass spawning survey.

Age	Number Caught		Total
	Male	Female	
3	2	1	3
4	6	12	18
5	3	5	8
6	2	11	13
7	4	11	15
8	1		1
9		1	1
10	4	15	19
11	2	2	4
12	1	1	2
13	1		1
14	1	1	2
16		1	1
17		1	1
Total	27	62	89

Table 5.1.4 Number of Smallmouth Bass caught by date, sex, and gonad condition. Note that female fish with eggs that were not running freely were labelled pre-spawn female regardless of whether they had spawned or not.

Date	Pre-spawn Male	Spent Male	Pre-spawn Female	Spawning Female	Total
May 1, 2012	19		10		29
May 17, 2012	1	1	7	4	13
May 24, 2012		2	18	2	22
May 29, 2012		3	5	6	14
June 6, 2012			1		1
June 12, 2012		1	9		10
Total	20	7	50	12	89

Table 5.1.5 Mean GSI (gonad weight / weight) of Smallmouth Bass by date. Note that female fish with eggs that were not running freely were labelled pre-spawn female regardless of whether they had spawned or not.

Date	Pre-spawn Female	Spawning Female	Average
May 1, 2012	8%		8%
May 17, 2012	7%	8%	7%
May 24, 2012	5%	7%	6%
May 29, 2012	5%	5%	5%
June 6, 2012	4%		4%
June 12, 2012	4%		4%
Average	6%	7%	6%

Figure 5.1.1 Location of sample sites in the western basin Smallmouth Bass spawning survey.

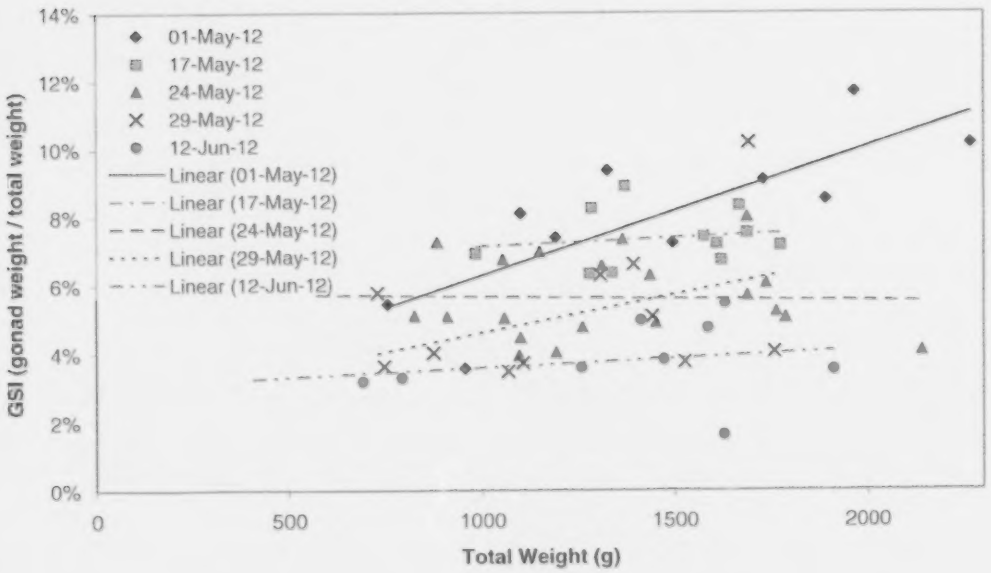

Figure 5.1.2 Relationship between GSI and weight of female Smallmouth Bass by date in the western basin Smallmouth Bass spawning survey.

5.2 Lake Erie Asian Carp Surveillance Program

The Asian Carps include four species of fish. Three of these species (Bighead, Silver and Grass Carps) have become naturalized in the United States. Two of these species (Bighead and Silver Carps) have dispersed north up the Mississippi River basin and have the potential to colonize the Great Lakes.

Environmental DNA (eDNA) is genetic material which is shed by living or dead organisms into the environment. The presence of eDNA in the environment indicates that the organism may have been present. The collection of eDNA provides a method for detecting species present in low abundance, which may not be found through conventional surveys. In September 2012, LEMU commenced a field program to assess if Asian Carp are present in the Canadian waters of Lake Erie or the St. Clair System. This program utilized both electrofishing and water samples tested for eDNA from Bighead and Silver Carps.

The LEMU Asian Carp surveillance program occurred from September to November 2012. During this time water samples were taken from 124 sites in western Lake Erie (15 sites), Rondeau Bay (5 sites), Lake Erie tributaries (20 sites), Detroit River (17 sites), Lake St. Clair (11 sites), St. Clair River (14 sites), Thames River (24 sites), and Sydenham River (18 sites) (Figure 5.2.1). Ninety-six of these sites were sampled twice. In addition, seventy-one sites were electrofished, for approximately 1000 seconds, to search for Asian Carp.

Environmental DNA water sampling followed the University of Notre Dame protocol, which was also used by the Ohio and Michigan Department of Natural Resources. Three water samples were taken during each sampling event in order to verify any potential positive results. The LEMU Wheatley office filtered the water samples. Filtered samples were sent to Dr. Chris Wilson (Aquatic Research and Development Section, Trent University) for DNA amplification and gel electrophoresis.

During the program, no Asian Carp were observed during electrofishing and no Asian Carp eDNA was detected in water samples. LEMU will continue surveillance for Asian Carp in 2013.

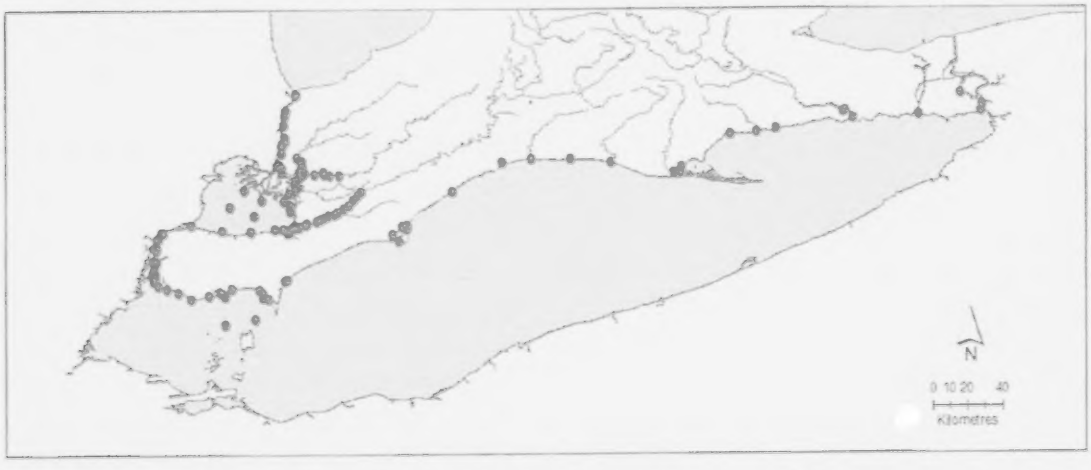

Figure 5.2.1 Location of sample sites for 2012 Asian Carp surveillance program.

6. LAKE ST. CLAIR PROJECTS

6.1 St. Clair System Sport Fishery Diary Program

The St. Clair System Sport Fishery Diary Program is an ongoing survey used to track general trends in catch rates and angler activity targeting a variety of fish species in Lake St. Clair, Detroit River and St. Clair River. This is a combined program with the Lake Erie Sport Fishery Diary Program and volunteer anglers complete a page in a diary for each fishing trip taken as outlined in section 3 of this report.

In 2012, 56 volunteers completed diaries in the St. Clair System (Lake St. Clair, Detroit River and St. Clair River) (Table 6.1.1). Anglers from both Ontario and Michigan participated in the diary program for the St. Clair System. LEMU collected information from Ontario anglers, while the Michigan Department of Natural Resources collected data from Michigan anglers. There were 34 participants in Lake St. Clair, 30 participants in the Detroit River, and 15 participants in the St. Clair River (some anglers fish in more than one area). The number of participants increased in all areas from 2011, when there were 31 participants in Lake St. Clair, 27 participants in the Detroit River, and 13 participants in the St. Clair River.

In total there were 1,007 trips by angler diarists in the St. Clair System (Table 6.1.1). The total effort was 10,637 rod hours, with 65% of effort in Lake St. Clair, 28% in the Detroit River and 8% in the St. Clair River.

Table 6.1.1 Total effort reported by Sport Fishery Diary Program participants in Lake St. Clair, Detroit River, and St. Clair River, 2012.

Survey Area	Number of Diarists	Number of Trips	Number of Rods per Trip	Total Rod Hours	Hours per Trip
Lake St. Clair	34	530	2.8	6,884	4.6
Detroit River	30	395	1.8	2,931	4.1
St. Clair River	15	82	2.0	821	5.0
Total	**56**[a]	**1,007**	**2.5**	**10,637**	**4.5**

[a] Diarist may fish more than one survey area in a year.

Lake St. Clair

Lake St. Clair diarists fished 6,884 rod hours of effort over 530 fishing trips (Table 6.1.1). In 2012, 52% of diary participant effort in Lake St. Clair was directed towards Walleye, 34% of effort was directed towards Yellow Perch, 15% of effort was directed towards Smallmouth Bass, and 12% of effort was directed towards Muskellunge (effort may be directed towards more than one species simultaneously) (Table 6.1.2, Figure 6.1.1). Additional species targeted with greater than 1% of the effort included Pumpkinseed (6%) and Channel Catfish (1%).

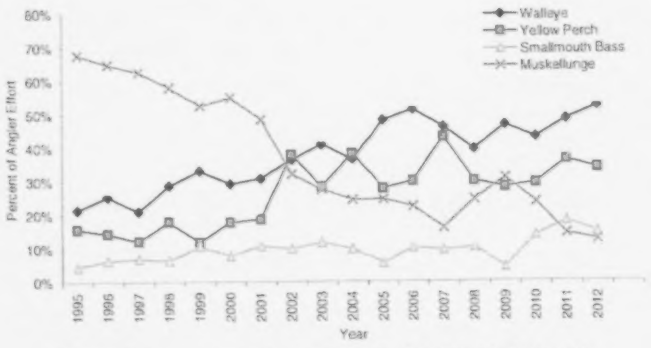

Figure 6.1.1 Percent of angler diarist effort in Lake St. Clair by species 1995-2012.

The 2012 Walleye catch rate (0.553 fish per rod hour) increased 62% percent from the 2011 catch rate (Table 6.1.2). The Yellow Perch catch rate (3.041 fish per rod hour) increased 3% from the 2011 catch rate. In 2012 the Yellow Perch catch rate in Lake St. Clair was slightly higher than the catch rate in the Detroit River; however the Detroit River had a higher catch rate in the previous five years (Figure 6.1.4). The Smallmouth Bass catch rate (0.725 fish per rod hour) increased 42% from 2011. The 2012 Muskellunge catch rate (0.137 fish per rod hour) increased 52% from 2011 (Table 6.1.2).

Detroit River

Detroit River diarists fished 2,931 rod hours of effort over 395 fishing trips (Table 6.1.1). In the Detroit River, 95% of diary participant effort was directed towards Walleye, 4% of effort was directed towards Yellow Perch, and less than 1% of effort was directed towards Smallmouth Bass, (Table 6.1.2, Figure 6.1.2). Additional species targeted with less than 1% of the effort included: Largemouth Bass, Rock Bass, White Bass, and Bluegill.

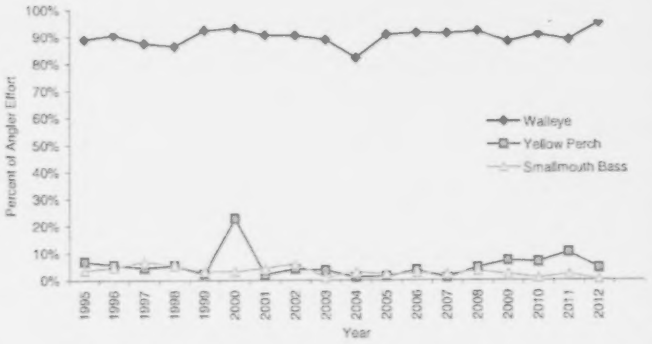

Figure 6.1.2 Percent of angler diarist effort in the Detroit River by species 1995-2012.

The 2012 Walleye catch rate (0.739 fish per rod hour) increased 45% percent from the 2011 catch rate (Table 6.1.2). The Walleye catch rate in the Detroit River was higher than the Walleye catch rate in Lake St. Clair and St. Clair River (Figure 6.1.5). This differed from 2011 when the highest average Walleye catch rate was in the St. Clair River. The Yellow Perch catch rate (2.750 fish per rod hour) decreased 34% from the 2011 catch rate. The Smallmouth Bass catch rate (0.783 fish per rod hour) increased 11% from 2011. The Smallmouth Bass catch rate in the Detroit River was higher than the Smallmouth Bass catch rate in Lake St. Clair (Figure 6.1.6). This trend has remained for the past three years.

St. Clair River

St. Clair River diarists fished 821 rod hours of effort over 82 fishing trips (Table 6.1.1). In the St. Clair River, 78% of diary participant effort was directed towards Walleye, and 1% of effort was directed towards Rainbow Trout, (Table 6.1.2, Figure 6.1.3).

The 2012 Walleye catch rate (0.618 fish per rod hour) increased 3% from the 2011 catch rate, however it was below the long term average (Table 6.1.2). The Rainbow Trout catch rate (0.067 fish per rod hour) doubled from the 2011 catch rate.

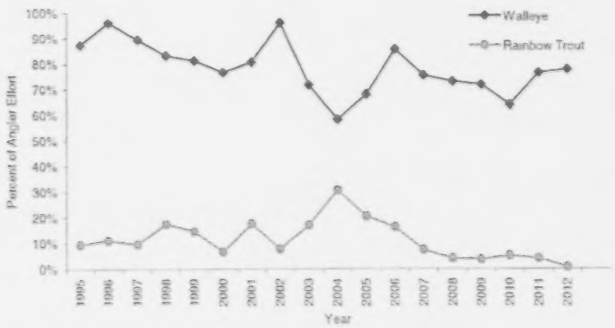

Figure 6.1.3 Percent of angler diarist effort in the St. Clair River by species 1995-2012.

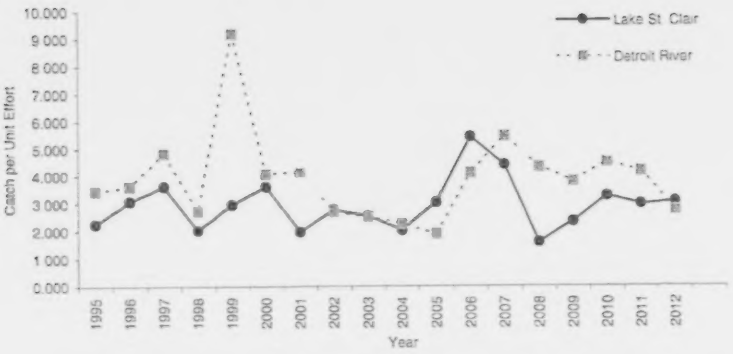

Figure 6.1.4 Yellow Perch catch per unit effort (fish per rod hour) in Lake St. Clair and the Detroit River, Sport Fish Diary Program 1995-2012.

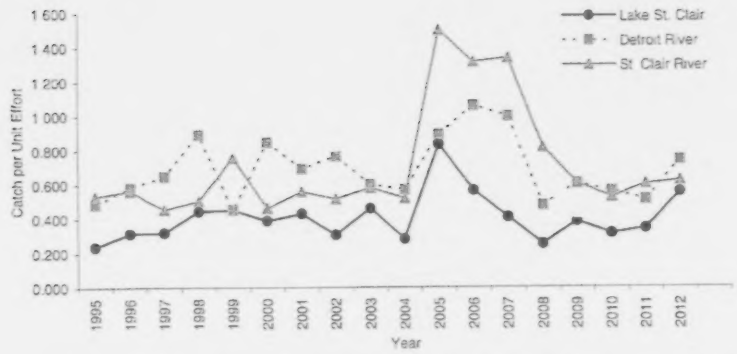

Figure 6.1.5 Walleye catch per unit effort (fish per rod hour) in Lake St. Clair, Detroit River and St. Clair River, Sport Fish Diary Program 1995-2012.

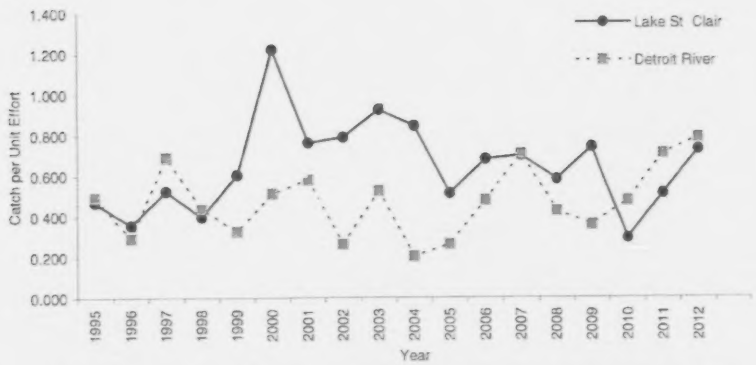

Figure 6.1.6 Smallmouth Bass catch per unit effort (fish per rod hour) in Lake St. Clair and the Detroit River, Sport Fish Diary Program 1995-2012.

Table 6.1.2 Angler success rates (CPUE) of non-charter boat anglers targeting particular species in the Lake St Clair, Detroit River and St Clair River, 1995-2012[a]. Effort may be directed at more than one species simultaneously.

Lake St Clair

Year	Total Rod Hours	Walleye				Yellow Perch				Smallmouth Bass				Muskellunge			
		Trips	Rod Hours	CPUE	% Total Effort	Trips	Rod Hours	CPUE	% Total Effort	Trips	Rod Hours	CPUE	% Total Effort	Trips	Rod Hours	CPUE	% Total Effort
1995	28,867	451	6,185	0.234	21%	340	4,524	2.246	16%	137	1,317	0.467	5%	642	19,524	0.073	68%
1996	24,093	484	6,097	0.313	25%	265	3,462	3.076	14%	153	1,533	0.356	6%	494	15,629	0.093	65%
1997	22,387	409	4,697	0.317	21%	253	2,714	3.607	12%	149	1,537	0.524	7%	400	14,010	0.103	63%
1998	19,532	510	5,600	0.443	29%	304	3,505	2.008	18%	127	1,248	0.397	6%	383	11,326	0.095	58%
1999	17,509	622	5,792	0.450	33%	224	2,065	2.943	12%	222	1,841	0.604	11%	314	9,199	0.069	53%
2000	15,862	442	4,613	0.387	29%	228	2,811	3.594	18%	190	1,216	1.220	8%	267	8,714	0.086	55%
2001	15,644	444	4,797	0.428	31%	246	2,907	1.958	19%	209	1,665	0.763	11%	254	7,568	0.115	48%
2002	12,327	425	4,475	0.303	36%	412	4,658	2.756	38%	153	1,207	0.790	10%	156	3,953	0.070	32%
2003	13,577	543	5,533	0.458	41%	335	3,829	2.532	28%	179	1,586	0.924	12%	141	3,730	0.091	27%
2004	10,287	393	3,740	0.280	36%	293	3,917	2.019	38%	126	1,000	0.845	10%	114	2,510	0.094	24%
2005	10,104	526	4,845	0.833	48%	232	2,798	3.028	28%	82	556	0.514	6%	109	2,468	0.085	24%
2006	8,229	436	4,204	0.564	51%	231	2,455	5.401	30%	84	829	0.681	10%	89	1,838	0.071	22%
2007	7,911	376	3,633	0.407	46%	275	3,399	4.384	43%	90	742	0.698	9%	65	1,264	0.118	16%
2008	7,164	291	2,819	0.250	39%	154	2,143	1.578	30%	88	731	0.581	10%	81	1,752	0.060	24%
2009	8,903	425	4,142	0.381	47%	157	2,495	2.326	28%	42	378	0.738	4%	79	2,746	0.103	31%
2010	7,010	305	3,008	0.310	43%	157	2,051	3.252	29%	88	964	0.290	14%	53	1,651	0.090	24%
2011	6,994	323	3,373	0.341	48%	165	2,525	2.947	36%	84	1,256	0.509	18%	28	994	0.090	14%
2012	6,884	352	3,587	0.553	52%	143	2,317	3.041	34%	71	1,009	0.725	15%	31	853	0.137	12%
95-12 Avg.	13,516	431	4,508	0.403	38%	245	3,032	2.928	22%	126	1,145	0.646	8%	206	6,096	0.091	47%

Detroit River

Year	Total Rod Hours	Walleye				Yellow Perch				Smallmouth Bass				Muskellunge			
		Trips	Rod Hours	CPUE	% Total Effort	Trips	Rod Hours	CPUE	% Total Effort	Trips	Rod Hours	CPUE	% Total Effort	Trips	Rod Hours	CPUE	% Total Effort
1995	4,297	558	3,817	0.482	89%	41	286	3.439	7%	28	149	0.494	3%	9	164	0.171	4%
1996	4,087	569	3,695	0.583	90%	30	218	3.611	5%	26	186	0.290	5%	9	133	0.248	3%
1997	4,867	625	4,255	0.646	87%	33	206	4.807	4%	44	330	0.691	7%	11	113	0.177	2%
1998	5,247	707	4,533	0.890	86%	32	272	2.696	5%	32	275	0.437	5%	25	150	0.133	3%
1999	3,861	622	3,560	0.450	92%	14	80	9.157	2%	17	122	0.327	3%	9	63	0.079	2%
2000	3,333	503	3,103	0.847	93%	15	758	4.053	23%	16	107	0.513	3%	8	21	0.578	1%
2001	4,036	531	3,654	0.690	91%	12	77	4.147	2%	23	177	0.582	4%	18	137	0.007	3%
2002	4,382	553	3,961	0.763	90%	15	175	2.671	4%	26	265	0.264	6%	17	234	0.141	5%
2003	3,733	463	3,317	0.597	89%	13	132	2.500	4%	4	32	0.527	1%	20	152	0.204	4%
2004	2,947	300	2,420	0.568	82%	4	28	2.237	1%	12	88	0.204	3%	16	191	0.257	6%
2005	2,299	245	2,086	0.891	91%	4	31	1.888	1%	8	50	0.263	2%	3	13	0.154	1%
2006	1,789	219	1,635	1.057	91%	7	64	4.094	4%	4	48	0.479	3%	1	22	0.091	1%
2007	1,418	172	1,294	0.997	91%	3	13	5.440	1%	5	34	0.706	2%	2	42	0.095	3%
2008	1,473	153	1,355	0.477	92%	14	68	4.317	5%	6	50	0.424	3%	0	0	0.000	0%
2009	3,064	365	2,704	0.604	88%	26	219	3.791	7%	7	70	0.357	2%	2	30	0.267	1%
2010	3,468	391	3,150	0.560	91%	19	233	4.495	7%	4	30	0.475	1%	1	24	0.000	1%
2011	2,832	364	2,519	0.509	89%	37	288	4.154	10%	9	61	0.706	2%	0	0	0.000	0%
2012	2,931	377	2,792	0.739	95%	16	129	2.750	4%	2	8	0.783	0%	0	0	0.000	0%
95-12 Avg	3,337	429	2,992	0.686	90%	19	182	3.903	5%	15	116	0.473	3%	8	83	0.145	2%

St Clair River

Year	Total Rod Hours	Walleye				Rainbow Trout				Chinook			
		Trips	Rod Hours	CPUE	% Total Effort	Trips	Rod Hours	CPUE	% Total Effort	Trips	Rod Hours	CPUE	% Total Effort
1995	2,179	316	1,900	0.530	87%	15	205	0.010	9%	27	309	0.013	14%
1996	2,070	318	1,984	0.562	96%	16	229	0.000	11%	36	516	0.033	25%
1997	2,299	276	2,053	0.453	89%	21	220	0.009	10%	37	505	0.075	22%
1998	2,852	311	2,372	0.503	83%	36	501	0.000	18%	67	733	0.046	26%
1999	2,189	274	1,776	0.754	81%	33	321	0.012	15%	67	603	0.045	28%
2000	1,330	165	1,017	0.460	76%	16	88	0.045	7%	31	227	0.084	17%
2001	1,391	161	1,121	0.558	81%	20	244	0.021	18%	22	190	0.068	14%
2002	841	120	807	0.514	96%	10	65	0.015	8%	17	182	0.044	22%
2003	848	97	608	0.577	72%	12	144	0.014	17%	21	261	0.291	31%
2004	1,078	84	627	0.519	58%	20	329	0.146	31%	11	128	0.016	12%
2005	1,279	150	869	1.499	68%	14	262	0.031	20%	6	75	0.107	6%
2006	1,428	175	1,222	1.313	86%	9	232	0.026	16%	0	0	0.000	0%
2007	977	118	736	1.335	75%	3	72	0.167	7%	1	3	0.400	0%
2008	964	123	703	0.815	73%	1	39	0.385	4%	2	5	0.632	0%
2009	951	98	681	0.606	72%	3	35	0.000	4%	3	22	0.000	2%
2010	1,077	68	689	0.523	64%	1	54	0.019	5%	1	6	0.000	1%
2011	726	61	555	0.600	76%	1	30	0.033	4%	0	0	0.000	0%
2012	821	70	638	0.618	78%	1	6	0.067	1%	0	0	0.000	0%
95-12 Avg.	1,405	166	1,131	0.708	78%	13	171	0.056	11%	19	209	0.103	12%

[a]CPUE represents observed catch divided by observed angling effort in rod-hours directed at that particular species.

6.2 Lake St. Clair Fall Trap Net Index

The Lake St. Clair Fall Trap Net Index is an adult fish community index that has been conducted annually since 1974. This program surveys the adult fish community at three sites in Lake St. Clair and information from this program provides a trend through time data series describing fish species composition, indices of abundance, and age group composition for each sampling location.

Single trap nets were set at three index fishing sites on Lake St. Clair as shown in Figure 6.2.1. The south shore site was Tremblay Creek, Mitchell's Bay was the north shore site, and the east shore site was St. Luke's. All three sites were fished in 1974; however from 1975 to 1985 only two sites, Tremblay Creek and Mitchell's Bay were fished. From 1986 to 2012, all three sites were fished each year, with the exception of 1999, 2002, and 2010 when no fishing occurred.

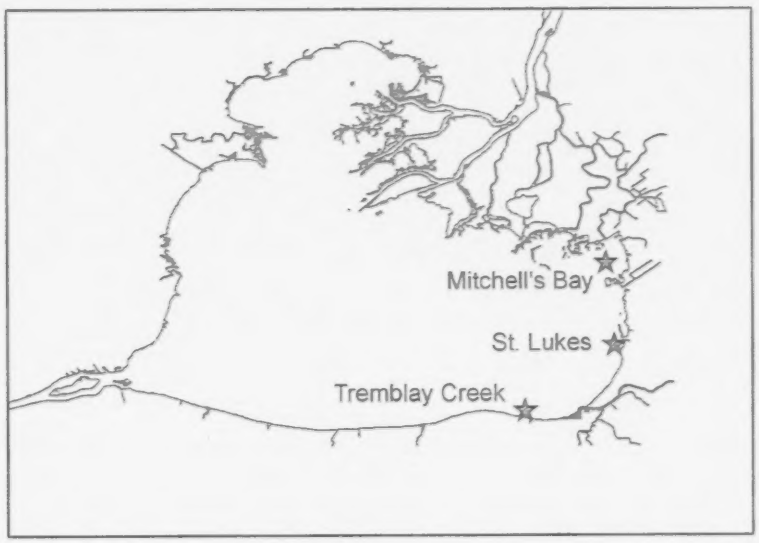

Figure 6.2.1 Lake St. Clair Fall Trap Net Index site locations.

Nets were set approximately 0.8 kilometres from the shoreline, with the leads set perpendicular to the shoreline. The water depth at the index fishing sites averaged three metres. The nets were approximately 20 ft. long, with an 8 ft. long front end and 40 ft. wings. The lead of the nets was 310 ft. long with 7 inch mesh. The wings and front had 4 inch mesh; the crib had 2 inch mesh. In 2012, the nets were set from September 28 to November 19. Lifts were was scheduled for three times per week, however, in many cases nets were lifted less frequently than this due to rough water conditions.

At each sampling event, all nets were lifted, emptied of fish, and immediately reset. All fish were identified and fork length was measured. Selected species were sub-sampled in the field for later age assessment, or returned to the lab for more detailed examination and contaminant sample preparation. Secchi disc depth and water temperature were recorded at each lift.

In 2012, there was a total of 131 net nights of effort (Figure 6.2.2). There were 48.8 net nights of effort at Mitchell's Bay, 51.8 nights of effort at St. Luke's, and 30.8 nights of effort at Tremblay Creek. Twenty-one nights of effort were lost at Tremblay creek due to net damage.

In total, across all survey years, 43 different species have been captured during the Lake St. Clair fall trap net index. On average, from 1974 to 2011, the most commonly caught species in the survey were Freshwater Drum, Channel Catfish, Walleye, and White Perch. In 2012 thirty species were caught. The most commonly caught species were Channel Catfish (18% of the catch), Bluegill (16%), Freshwater Drum (15%), and Pumpkinseed (11%) (Figure 6.2.3). In 2012, at the Mitchell's Bay site the most common species were Bluegill (34%), Pumpkinseed (24%), and Northern Pike (9%). The most common species at St. Luke's were Freshwater Drum (31%), Channel Catfish (29%), and White Perch (20%). The most common species at Tremblay Creek were Channel Catfish (34%), Freshwater Drum (17%), and White Perch (10%).

The total catch per net night at all three sites combined, was 15.6 fish in 2012; this was a decrease of 4% from 2011 (Figure 6.2.3). At Mitchell's Bay the catch rate was 19.3 fish per net night, an increase of 127% from 2011 (Table 6.2.1). The St. Luke's catch rate decreased 37% in 2012 to 13.3 fish per net night (Table 6.2.2). At Tremblay Creek the catch rate was 13.8 fish per net night, a decrease of 30% from 2011 (Table 6.2.3). The highest Muskellunge catch rate observed, at all three sites combined, during the survey occurred in 2012 (0.145 fish per net night). This was mainly due to one large catch of Muskellunge at Tremblay Creek on November 16th. Also in 2012, Mitchell's Bay had the highest observed catches in the last decade for several species including: Northern Pike, Bowfin, Black Crappie, Bluegill, and Pumpkinseed.

The average Walleye CUE has decreased since the beginning of the survey period. From 1974 to 1990 the average Walleye CUE was 5.3 fish per net night, this decreased to an average of 1.2 fish per net night from 1991-2012 at the Tremblay Creek and Mitchell's Bay sites combined (standard north and south sites, fished from 1974 to 2012). In 2012, the mean Walleye CUE was 0.6 fish per net night (at all sites combined), and Walleye comprised 3.6% of the catch. The long term (1986 to 2012) average CUE at all sites combined was 1.9 fish per net night and Walleye comprised 8% of the catch on average. In 2012, the highest catch rates of Walleye were at the Tremblay creek site (Figure 6.2.4).

In 2012, the highest Yellow Perch catch rate was at Mitchell's Bay (0.31 fish per net night) (Figure 6.2.5). In previous years, Tremblay Creek had a higher catch rate for Yellow Perch; however in 2012 no Yellow Perch were caught at Tremblay Creek. The overall 2012 catch rate (0.18 fish per net night) was less than the long term average (0.31 fish per net night), and Yellow Perch comprised 1.2% of the catch compared to the 1986 to 2012 average value of 1.8%.

In 2012, the highest Smallmouth Bass catch rate was at Tremblay Creek (0.42 fish per net night). However, the Smallmouth Bass catch rate has declined at Tremblay Creek since the early 2000's (Figure 6.2.6). The average 2012 Smallmouth Bass catch rate at all sites combined (0.25 fish per net night) was less than the long term average (0.60 fish per net night) and Smallmouth Bass comprised 1.6% of the catch compared to the 3.4% long term average.

Table 6.2.1 Catch per net night by species and year at the Mitchell's Bay site (A hyphen (-) indicates no fish were caught, a zero (0) indicates less than 0.05 fish per net night).

	CATCH PER NET NIGHT																														
YEAR	Freshwater Drum	Walleye	Yellow Perch	Black Crappie	Largemouth Bass	Smallmouth Bass	Bluegill	Pumpkinseed	Rock Bass	White Bass	White Perch	Burbot	Stonecat	Channel Catfish	Brown Bullhead	Common Carp	Shorthead Redhorse Sucker	Golden Redhorse Sucker	Silver Redhorse Sucker	Spotted Sucker	Bigmouth Buffalo	White Sucker	Quillback Carpsucker	Mooneye	Muskellunge	Northern Pike	Gizzard Shad	Bowfin	Longnose Gar	Others*	TOTAL
1974	0.3	0 7	0.0	7.0	0.5	0.0	2.3	16.0	2 0	0.1	-	-	-	1.9	0.8	1.3	-	-	-	-	-	0.1	0.0	-	-	0.7	0.1	2.1	-	0.2	36 0
1975	0.7	2.6	0.2	16.9	0.3	0.1	1.9	2.9	0.2	0.3	-	-	-	2.1	1.5	2.7	-	-	-	-	-	0.1	0.1	-	0.0	0.6	0.0	0.9	0.0	0.2	34.3
1976	4.3	4 3	0.1	8.5	0.6	0.3	2.8	5.4	2.4	0.7	-	-	-	1.9	2.1	10.6	0.0	-	0.2	-	-	0.4	0.4	-	-	1.6	0.0	1.5	-	0.3	48.5
1977	0.2	1.4	0.0	7.0	0.2	0.2	0.2	0.9	0.3	0.1	-	-	-	1.8	1.6	1.7	0.2	-	0.0	-	-	0.3	0.1	-	-	0.4	0.1	0.9	-	-	18.8
1978	2.8	2.3	0.1	7.2	0.1	0.5	0.2	2.2	0.3	0.3	-	-	-	0.9	1.9	4.5	0.0	0.0	-	-	-	0.1	0.1	-	-	0.5	0.1	0.7	-	0.1	24 6
1979	5.9	3.4	0.1	2.3	0.2	0.4	0.0	1.4	0.7	0.4	-	-	-	1.9	0 9	1 0	0.4	0.2	0.1	-	-	0.2	0.3	0.0	-	0.6	-	0.9	0.0	0.1	36.4
1980	3.9	3.3	0.1	3.0	0.1	0.4	0.1	3.9	0.5	0.2	-	-	-	1.7	1.4	6.8	0.1	-	0 2	-	-	0.1	0.1	-	-	0.6	0.1	1.1	-	0.0	27.5
1981	6.9	2.6	0.6	3.5	0.0	0.3	-	3.3	0.3	0.1	0.1	-	-	0.6	1.2	5.4	0.4	0.0	-	-	0.0	0.1	0.1	-	-	0.6	-	3.5	-	-	29.6
1982	4.8	2.0	0.6	4 5	0.1	0.6	0.2	4.1	0.3	0.4	0.1	-	-	1.1	0.9	4.8	0.2	0.0	0.0	-	0.0	0.1	-	0.0	-	0.4	0.0	1.2	-	-	26.4
1983	3.0	2.6	0.7	11 9	0.2	0.3	0.7	7.7	1.2	0.2	0.1	-	-	0.4	0.5	0.5	0.4	0.2	0.1	0.0	0.0	0.0	0.1	-	-	0.5	0.0	0.8	-	-	31.8
1984	2.8	1.7	0.1	13.7	0.3	0.7	0.5	2.9	0.5	0.2	0.1	-	-	0.6	0.3	0.9	0.2	0.1	0.1	0.0	0.1	0.0	0.0	-	-	0.3	0.1	0.4	-	-	26 3
1985	4.4	3.2	0.3	19.5	0.5	1.2	0.3	10.6	0.7	0.6	0.1	-	-	1.9	2.3	1.6	1.1	0.1	0.1	-	-	0.3	0.1	-	-	0.7	0 0	2.3	-	-	51.4
1986	5.4	2.0	0 1	6.2	0.1	0.2	0.1	1.2	0.5	0 5	0.9	0.0	-	2.7	0 2	1.2	0.5	0.1	0.3	0.0	-	0.1	0.3	-	-	0.3	0.0	0.3	-	0.1	23.1
1987	4.4	2.4	0.3	1.6	0.3	0.3	0.2	1.3	0.8	0.1	0.4	-	-	0.6	1.5	1.2	0.1	0.0	0.1	-	-	0.1	0 0	0.1	-	1.1	0 1	0 8	-	0.0	17.7
1988	3.4	1.6	0.1	0.4	0.0	0.0	1.0	0.8	0.4	0.2	0.2	-	-	0 2	1.1	1.0	0.1	0.1	-	-	-	0.0	0.1	0.0	-	0.6	-	0.7	-	-	12.0
1989	2.5	0.8	0.2	1.6	0.2	0.2	0.8	0.6	0.3	0.0	-	-	-	0.8	0.1	0.8	0.3	0.1	0.1	-	-	0.1	0.1	-	-	0.6	-	0.2	-	-	10.1
1990	4.4	0.9	0.0	1.4	0.1	0.3	1.2	0.6	0.3	0.0	0.4	-	-	1.6	0.5	1.0	0.5	0.0	0 1	0.1	0.0	0.2	0.0	-	-	0.1	0.0	0.3	-	-	14.1
1991	1.6	0.3	0.0	2.5	0.4	0.7	1.5	0.7	0.2	0.1	-	-	-	0.8	0.1	0.5	0.2	0.1	0.0	-	-	-	0.0	-	0.0	0.1	0.0	0 1	-	0.0	10.3
1992	4.4	1.2	0.4	3.3	0 0	0 7	0 2	1.1	1.1	0.1	0.3	-	-	0.9	0.1	0.6	0.4	0.1	0.1	0.0	-	0.1	0.1	-	0.0	0.4	-	0.1	-	-	15.7
1993	5.6	2.4	0.4	0.6	0.7	0.2	1.2	2.0	0.7	0.1	0.3	-	-	0 9	0.2	0.7	0.2	0.1	0.6	0.0	0.0	0.0	0.1	-	-	0.7	0.1	0.4	-	-	18.2
1994	2.9	0.9	1.3	1.9	0.3	0.2	3 4	1.7	1.0	0 7	-	-	-	1.2	0 4	0 6	0.5	0.1	0.2	0.1	0.0	0.0	0.8	-	-	0.3	0.0	0.2	-	-	18.6
1995	0.4	0.2	0.4	0.5	0 3	0.0	7 2	1 5	0.1	-	0.1	-	-	0.4	0.2	0.4	0.1	-	-	0.1	-	-	-	-	-	0.5	-	0.1	-	-	12.6
1996	6.2	1 4	0.5	1 5	0.2	0.1	2.3	2 2	0.6	0.1	1.1	-	-	0 4	0.1	0 6	0.3	0.2	0 2	-	0 0	0.0	0 2	-	-	0.7	-	0.2	-	-	19.6
1997	2.7	0.5	0.1	0.8	0.3	0.3	1.2	3.1	1.1	0.1	0.3	-	-	1.0	0 2	0 5	0.2	0.1	0.1	0.1	-	-	0.0	0.0	-	0.4	0.0	0.1	-	-	13.0
1998	0.8	0.5	0.7	0.2	0.1	0.2	0.0	0.4	1.5	0.1	0.2	-	-	0.2	-	0.3	0.3	0.1	0.1	0.0	0.0	-	0 3	-	0.0	0.4	0 1	0 1	-	0.0	6.5
2000	4.6	1.8	0.4	1.0	1 1	0.9	0.8	1.4	0.6	0.3	0.5	-	-	1.2	0.1	1.1	0.4	0.1	1.7	0.2	0.1	-	0.4	-	-	2.8	0.1	0.5	-	-	21.8
2001	3.6	0.6	0.2	0.2	0.2	0.1	0.9	1.2	0.2	0.1	0.4	-	-	0.4	0.4	0.6	0.3	-	0.2	0.1	0.1	-	0.2	0.0	0 1	0.9	-	0.4	-	-	11.1
2003	3.3	0.6	0.1	0.1	0 2	0.1	0 2	0.3	0.4	0 1	0.7	-	-	0.5	0.1	0.1	0.1	-	0.5	0.1	-	-	0.3	0.0	0.1	0.3	0.3	0.0	0.0	0.0	8.4
2004	2.2	0.3	0.9	0.2	0.4	0.3	0.4	3.2	0.9	0.1	0.6	-	-	0.9	0.1	0.5	0.2	0.1	0.4	0.1	0.0	-	0.2	-	0.0	0.3	0.0	0.2	-	-	12.3
2005	1.2	0.1	0.3	0 2	0 3	0.2	1.0	1 0	0.5	0 0	0.2	-	-	0 2	0.1	0 7	0.1	-	0.1	-	-	-	-	-	-	0.2	-	0 1	-	-	8.1
2006	2.4	1.3	0.5	0.1	1.0	0.1	1.4	4.3	0.5	0.6	1.2	-	-	0.4	0.1	1.8	0.4	0.2	0.2	0.2	0 2	-	0.2	0.1	0.0	1.9	0.2	0.1	-	0.5	19.9
2007	0.7	0.2	0.1	-	0.6	0.0	2.3	3.1	0.9	0.1	0.1	-	-	0 4	0.0	0 5	0.0	0 0	0.0	0 1	-	-	0.1	-	-	0.4	0.0	0.0	-	0.0	9.9
2008	0.6	0.2	0.0	0.0	0.2	0.1	0.1	0.5	0.3	0.1	0.1	-	-	0.4	0.0	0.2	-	0.0	0.1	0.1	-	-	0.1	0 0	-	0.2	-	0 0	-	0.0	3 6
2009	1.1	0.5	0.2	0.0	0.3	0.2	0.3	1.4	0.7	0.0	0.3	-	-	0.3	0.0	0.2	0.0	0.0	-	0.0	-	-	0.1	-	0.0	0.2	-	-	-	0.1	6.2
2011	0.3	0.1	0.4	0.0	0.2	0.1	0.3	3.1	0.3	0.4	0.8	-	-	1.4	0.0	0.2	0.0	0.1	0.1	0 0	0.0	-	0.0	-	0.0	0.1	0.0	0.4	-	0 1	8.5
2012	0.3	0 6	0.3	1 0	0 7	0.0	6.6	4.7	0.2	0 1	0.3	-	-	0 3	0.3	0 5	0.1	0.0	0.2	0.1	0.0	0.1	0.0	-	0.1	1.7	-	0.5	0.0	0.5	19.3
Mean	2.9	1.4	0.3	3.7	0.3	0.3	1.2	2.8	0.7	0.2	0.4	0.0	-	1.0	0.6	1.6	0.3	0.1	0.2	0.1	0.0	0.1	0.1	0.0	0.0	0.6	0.1	0.6	0.0	0.1	19.8

*Others include: Goldfish, Rainbow Trout, Silver Lamprey, Lake Whitefish, Coho Salmon, and Yellow Bullhead.

Table 6.2.2 Catch per net night by species and year at the St. Luke's site (A hyphen (-) indicates no fish were caught, a zero (0) indicates less than 0.05 fish per net night).

	CATCH PER NET NIGHT																														
YEAR	Freshwater Drum	Walleye	Yellow Perch	Black Crappie	Largemouth Bass	Smallmouth Bass	Bluegill	Pumpkinseed	Rock Bass	White Bass	White Perch	Burbot	Stonecat	Channel Catfish	Brown Bullhead	Common Carp	Shorthead Redhorse Sucker	Golden Redhorse Sucker	Silver Redhorse Sucker	Spotted Sucker	Bigmouth Buffalo	White Sucker	Quillback Carpsucker	Mooneye	Muskellunge	Northern Pike	Gizzard Shad	Bowfin	Longnose Gar	Others*	TOTAL
1974	2.6	2.5	0.1	1.7	-	0.2	-	1.3	1.8	1.5	-	-	0.0	3.2	0.0	0.3	-	-	-	-	-	0.2	0.4	-	0.0	0.4	0.1	-	-	0.3	16.7
1986	22.0	6.4	0.7	0.2	0.0	0.8	-	0.1	1.2	3.5	14.6	-	-	4.5	-	0.7	0.9	0.2	0.8	-	-	0.4	1.3	-	0.0	0.2	-	-	-	-	58.6
1987	6.8	7.9	0.3	0.1	0.0	0.6	-	-	1.1	3.6	11.0	-	-	4.2	-	0.4	0.4	0.2	0.5	-	-	0.3	0.7	0.0	0.1	0.3	-	-	0.0	-	38.4
1988	15.2	5.3	0.0	0.1	0.0	1.4	0.0	0.1	0.8	4.0	7.8	0.0	-	3.7	0.0	0.8	0.7	0.0	0.5	-	-	0.1	0.7	0.1	0.0	1.1	0.0	-	0.1	0.1	42.7
1989	9.8	3.7	-	0.0	0.0	1.0	-	-	0.2	1.3	3.2	0.0	-	5.5	-	0.5	0.2	0.3	0.3	-	0.1	0.0	0.7	-	0.0	0.3	-	-	-	-	27.2
1990	7.9	3.1	0.4	-	0.0	0.6	-	-	0.3	2.0	5.0	0.0	-	8.1	0.0	1.0	1.0	0.3	1.8	-	-	0.3	1.5	-	0.1	0.5	0.0	0.0	-	-	34.0
1991	14.1	1.9	0.2	-	-	2.9	-	0.0	0.6	0.6	2.5	-	-	4.3	-	0.7	0.5	0.1	0.5	-	-	0.1	0.8	0.0	-	0.2	-	-	0.0	0 0	30.0
1992	7.2	1.0	0.3	-	0.0	0.1	0.0	0.1	0.5	0.1	0.9	0.0	-	1.8	0.0	1.5	0.4	-	0.0	-	-	0.1	0.5	-	-	0.1	-	0.0	-	-	14.8
1993	12.4	2.3	0.5	0.3	0.2	0.3	0.6	0.3	1.5	0.3	4.0	0.1	-	0 8	0.4	0.9	0.8	0.0	0.3	0.0	-	0.0	1.2	-	0.0	0.0	0.0	0.0	-	-	26.7
1994	12.0	3.9	0.4	-	0.1	4.1	0.1	0.1	1.1	0.6	1.0	0.1	-	6.3	0.1	0.7	0.7	0.1	0.4	-	0.0	0.1	0.9	-	0.0	0.2	-	0.0	-	0.0	32.7
1995	16.0	1.0	0.4	0.0	0.1	1.1	0.2	0.2	1.2	0.6	1.7	0.0	0.1	1.2	0.0	0.5	0.7	0.2	0.5	-	0.0	0.1	1.0	-	0.0	0.2	0.0	-	0.0	-	26.9
1996	11.7	1.5	0.0	0.2	0.2	0.5	0.1	0.2	1.3	0.7	3.2	0.0	-	3.8	0.0	1.4	0.4	0.4	0.3	-	0.0	0.0	1.8	-	0.1	0.1	0.0	0.0	0.1	-	28.1
1997	7.1	1.4	0.3	0.1	0.2	0.9	0.0	0.5	3.4	0.6	1.0	0.0	-	5.4	-	0.5	0.2	0.6	0.7	-	0.0	-	2.1	-	0.1	0.2	-	-	0.1	0.1	25.4
1998	5.8	0.4	0.7	-	-	0.3	-	0.3	1.6	0.1	1.6	0.0	-	2.3	-	0.1	0.1	0.2	0.1	-	-	0.1	0.3	-	0.0	0.1	-	-	0 0	-	14.3
2000	11.6	1.3	0.4	-	0.0	1.0	0.0	0.0	0.1	0.5	2.6	-	-	4.6	0.0	0.6	0.4	0.0	1.1	-	-	0.2	0.8	-	-	0.2	0.0	0.1	-	0.0	25.4
2001	8.9	0.7	0.1	-	0.0	0.3	-	0.0	0.2	0.7	1.8	-	-	4.6	-	0.4	0.4	-	0.4	-	-	-	0.5	-	0.1	0.1	0.0	-	-	0.0	19.1
2003	6.9	0.7	-	-	0.0	0.5	-	-	0.1	1.0	1.9	-	-	8.8	0.0	0.4	0.1	0.0	0.4	-	-	-	2.9	-	0.1	0.1	0.0	-	0.0	0.0	24.0
2004	5.5	0.3	0.1	0.1	0.1	0.2	-	0.2	0.8	0.5	5.6	-	-	1 8	0.0	0.4	0.3	0 1	0.4	-	0.1	0.1	0.4	-	-	0.0	-	0.0	0.1	0.0	17.0
2005	4.2	0.2	0.1	0.0	0.0	0.1	-	0.0	0.2	0.5	3.3	-	-	1.0	0.0	0.6	0.1	0.1	0.2	-	0.2	-	2.1	-	0.1	-	-	-	0.2	0.0	13.3
2006	10.6	1.1	1.1	-	0.0	0.3	0.1	0.1	1.1	0.5	3.9	-	-	2.3	-	0.9	0.5	0.1	0.0	-	-	-	2.7	-	0.0	-	-	-	0.1	0.2	25.7
2007	5.9	0.1	0.1	-	0.1	0.3	0.2	0.1	0.3	0.3	2.7	-	-	1.6	0.0	0.5	0.1	0.0	0.1	-	0.0	-	2.2	-	0.0	0.1	-	-	0.1	0.1	15.0
2008	4.0	0.6	0.1		0.0	0.1	0.0	-	0.5	0.5	1.8	-	-	2.2	-	0.4	0.0	0.0	0.3	-	0.0	-	1.7	-	0.0	0.1	0.0	-	0.1	0.0	12.8
2009	7.7	0.9	0.0	-	0.0	0.2	0.0	0.0	0.2	0.8	3.5	-	-	2.8	0.0	1.0	0.1	0.4	0.2	-	-	-	3.1	-	-	0.0	-	-	0.1	0.1	21.4
2011	7.6	0.9	0.1	-	0.1	0.4	-	0.1	0.3	1.7	4.3	-	-	2.6	0.0	0.3	0.0	0 2	0.2	-	0.0	-	1.8	0.0	-	-	0.1	-	0.1	0.0	20.9
2012	4.1	0.3	0.2	-	0.0	0.3	0.1	0.0	0.1	0.7	2.7	-	-	3.9	0.0	0 1	0.0	0.0	0.0	-	-	-	0.4	-	0.0	0.0	0.0	0.0	0.0	-	13.3
Mean	9.1	2.0	0.3	0.2	0.1	0.7	0.1	0.2	0.8	1.1	3.8	0.0	0.0	3.7	0.1	0.6	0.4	0.2	0.4	0.0	0.0	0.1	1 3	0.0	0.0	0.2	0.0	0.0	0.1	0.1	25.0

*Others include: Lake Whitefish, Longnose Sucker, Rainbow Trout, Silver Lamprey, Flathead Catfish, Goldeye, Yellow Bullhead, and Alewife

Table 6.2.3 Catch per net night by species and year at the Tremblay Creek site (A hyphen (-) indicates no fish were caught, a zero (0) indicates less than 0.05 fish per net night).

	CATCH PER NET NIGHT																														
YEAR	Freshwater Drum	Walleye	Yellow Perch	Black Crappie	Largemouth Bass	Smallmouth Bass	Bluegill	Pumpkinseed	Rock Bass	White Bass	White Perch	Burbot	Stonecat	Channel Catfish	Brown Bullhead	Common Carp	Shorthead Redhorse Sucker	Golden Redhorse Sucker	Silver Redhorse Sucker	Spotted Sucker	Bigmouth Buffalo	White Sucker	Quillback Carpsucker	Mooneye	Muskellunge	Northern Pike	Gizzard Shad	Bowfin	Longnose Gar	Others*	TOTAL
1974	12.9	6.3	1.4	0.0	-	0.4	-	0.0	2.8	1.6	-	-	0.9	2.6	-	0.1	-	-	-	-	-	0.7	0.2	0.1	-	0.0	-	-	-	1.2	31.3
1975	2.9	2.1	0.1	-	-	0.2	-	-	1.3	0.5	-	-	-	2.9	-	0.1	-	-	-	-	-	0.1	0.2	0.0	-	-	0.1	-	-	0.2	10.8
1976	6.8	3.8	0.2	-	-	0.2	-	-	0.9	0.8	-	-	0.1	0.8	-	0.4	0.5	-	0.2	-	-	0.1	0.1	0.1	0.1	-	0.1	-	-	0.1	15.0
1977	39.1	7.1	1.0	-	-	0.6	-	-	2.8	8.2	0.0	-	0.1	22.9	-	0.7	1.1	0.3	0.4	-	0.0	0.8	1.6	0.1	0.1	0.0	0.4	-	-	0.1	87.3
1978	16.3	9.5	1.8	0.0	0.0	0.8	0.0	0.0	2.7	3.1	0.0	0.0	0.1	4.5	0.0	0.2	0.9	0.3	0.0	0.0	0.0	0.6	0.4	0.0	0.0	0.0	0.1	0.0	0.0	0.1	41.3
1979	11.3	12.8	0.1	0.0	-	0.4	-	-	0.8	2.9	-	-	0.0	4.3	-	0.9	1.7	0.3	0.1	-	0.0	0.7	0.9	0.1	-	0.0	0.1	-	-	0.0	37.5
1980	30.2	13.2	0.5	0.1	-	0.2	-	-	1.2	2.2	0.1	-	0.0	1.7	-	0.8	1.0	0.2	0.4	-	-	0.6	1.5	0.0	0.1	-	0.1	0.0	-	-	54.1
1981	26.9	7.8	3.2	0.0	-	0.2	-	-	3.5	4.2	1.6	0.0	0.2	2.6	0.0	0.4	1.0	0.2	0.1	-	-	1.2	0.5	-	-	0.0	-	-	-	-	53.7
1982	3.0	9.1	1.4	0.1	-	0.2	-	-	3.1	1.5	2.5	-	-	1.3	-	0.3	0.9	0.1	0.1	-	-	0.6	0.1	-	-	-	0.1	-	0.0	-	24.3
1983	8.5	13.4	0.1	0.1	-	0.1	-	-	2.3	3.4	7.9	0.0	0.1	0.9	-	0.3	1.0	0.2	0.3	-	0.0	0.9	1.1	-	0.0	0.1	1.9	-	-	0.1	42.3
1984	3.2	4.4	1.6	0.0	-	0.3	-	-	2.6	0.9	9.0	0.0	0.1	2.4	-	0.1	0.2	0.1	0.2	-	-	0.6	0.2	0.0	0.0	0.0	0.5	-	-	-	26.5
1985	33.2	15.6	1.0	-	-	0.4	0.0	-	1.2	2.2	10.6	0.1	-	1.9	0.0	0.5	0.4	0.1	0.6	-	-	1.1	1.0	0.0	0.0	0.0	0.2	-	-	0.1	70.3
1986	13.6	13.4	0.5	0.1	-	0.1	-	-	1.3	2.2	22.1	0.2	0.1	3.8	-	1.0	0.5	0.1	0.4	-	-	0.7	1.1	-	0.1	0.1	-	-	-	0.1	61.4
1987	7.2	13.5	0.6	0.0	-	0.1	-	-	1.3	2.7	19.5	0.1	0.1	1.3	0.0	0.4	0.8	0.1	0.2	-	-	0.5	0.4	0.0	-	0.1	0.0	-	-	-	48.7
1988	2.3	6.7	0.2	-	0.0	0.9	-	-	1.5	0.9	8.0	0.1	0.0	1.3	-	0.3	1.1	0.2	0.2	-	-	0.4	0.5	0.0	0.0	0.1	-	-	0.1	0.0	24.9
1989	3.0	2.4	0.2	-	0.0	1.6	-	-	1.1	0.3	3.2	0.1	-	2.8	-	0.1	0.3	0.0	-	-	-	0.1	0.3	0.0	0.0	-	0.1	-	-	-	16.0
1990	3.2	5.8	0.2	-	-	0.9	-	0.0	0.9	0.6	8.2	-	-	2.3	-	0.8	0.7	0.2	1.2	-	0.0	0.2	1.1	0.1	0.1	0.0	0.1	-	-	-	26.7
1991	2.1	3.4	0.1	0.0	0.0	0.5	0.0	0.0	0.1	0.1	4.5	0.0	0.0	2.9	0.0	0.4	0.4	0.3	0.8	0.0	0.0	0.1	0.5	0.0	0.1	0.0	0.0	0.0	0.0	0.0	16.5
1992	2.6	1.8	0.1	-	-	0.3	-	-	0.1	0.4	1.6	-	0.0	2.5	-	0.6	0.6	0.0	0.9	-	-	0.0	0.6	0.1	0.1	-	0.0	-	-	0.0	12.3
1993	2.8	3.2	0.2	0.0	-	0.4	-	0.0	1.1	0.3	2.4	-	-	1.8	0.1	0.4	0.6	0.1	1.0	-	-	0.1	0.2	0.1	0.0	0.0	0.1	-	-	-	14.9
1994	3.0	2.0	0.1	-	0.1	0.7	0.0	-	1.2	0.0	0.7	-	-	2.6	-	0.2	0.6	0.1	0.9	-	-	0.0	0.2	-	0.1	0.0	-	0.0	-	-	12.5
1995	1.5	0.5	0.4	-	0.1	0.1	0.0	0.2	0.2	0.0	0.2	0.0	-	1.3	0.0	0.5	0.5	0.0	0.3	-	0.0	-	-	-	-	0.1	-	0.0	-	-	6.1
1996	8.7	3.2	0.6	0.0	0.0	0.9	-	0.0	1.4	0.4	4.3	-	-	5.0	0.1	0.7	0.5	0.2	0.2	-	0.0	0.0	0.1	-	0.0	0.2	0.0	-	-	-	26.7
1997	3.1	1.5	0.1	0.0	0.0	1.6	-	0.0	5.3	0.1	2.9	-	-	3.2	0.1	0.1	0.3	0.1	0.1	-	0.0	0.0	0.2	0.0	0.1	-	-	-	-	-	18.8
1998	2.2	0.8	0.2	-	-	1.8	-	-	1.1	0.1	0.7	0.1	-	3.8	-	0.0	0.3	-	0.0	-	-	0.1	0.1	-	0.0	0.1	0.4	-	-	0.1	11.8
2000	2.7	2.0	0.0	-	0.0	1.4	-	-	0.3	1.5	4.1	0.1	-	4.2	-	0.2	0.8	0.0	0.0	-	-	-	0.2	0.0	0.1	0.6	0.9	-	-	0.0	18.8
2001	2.1	1.3	0.9	-	-	1.7	-	-	0.6	0.4	5.4	-	-	6.1	-	0.3	0.4	-	-	-	-	0.0	0.5	-	0.1	0.2	-	-	-	-	19.8
2003	2.9	1.0	0.2	-	0.0	1.6	-	-	1.0	0.5	6.8	-	-	7.3	-	0.0	0.3	-	0.1	-	-	0.0	0.2	0.0	0.1	0.2	0.1	-	-	0.3	22.4
2004	1.2	0.7	0.1	-	0.1	0.6	-	0.0	0.9	0.2	2.9	-	-	3.2	-	0.1	0.3	0.1	0.1	-	0.0	-	0.2	-	0.1	0.1	0.1	-	0.0	0.1	11.0
2005	1.3	1.4	0.4	-	-	1.3	-	-	1.0	0.2	2.5	-	-	3.2	-	0.2	0.2	-	-	-	0.0	-	0.2	-	0.1	0.1	0.0	-	-	-	12.0
2006	9.9	3.7	0.5	-	0.1	0.9	-	0.0	0.3	0.7	3.8	-	-	11.3	-	0.8	0.4	0.1	0.3	-	0.0	-	2.2	0.0	0.2	0.1	0.4	-	-	0.2	36.1
2007	5.1	0.5	0.5	-	-	0.6	-	-	0.5	0.1	1.7	-	-	3.6	-	0.1	0.3	0.1	-	-	0.0	-	0.1	0.0	0.1	0.1	0.5	-	0.0	0.1	14.0
2008	4.0	0.5	0.7	-	-	0.9	-	-	0.8	0.6	2.7	-	-	3.7	-	0.1	0.3	0.1	0.0	-	0.1	-	0.2	-	0.1	0.1	0.1	-	-	0.0	15.1
2009	2.9	0.7	1.0	-	-	0.7	-	0.0	0.5	0.4	1.7	-	-	6.7	0.0	0.0	0.1	0.1	-	-	-	-	0.2	-	0.0	0.1	0.0	-	-	0.1	15.4
2011	4.1	1.1	0.4	0.0	-	0.5	0.0	0.1	0.4	1.9	4.5	-	-	4.1	-	0.2	0.3	0.2	0.2	-	-	-	1.2	0.0	0.2	0.0	0.1	-	-	0.0	19.6
2012	2.3	0.9	-	-	0.0	0.4	-	-	0.4	0.6	1.4	-	-	4.7	-	0.0	0.2	0.3	0.7	-	0.0	-	0.9	-	0.4	0.2	0.2	-	0.0	0.1	13.8
Mean	8.0	4.9	0.6	0.0	0.0	0.7	0.0	0.0	1.4	1.3	4.6	0.1	0.1	3.9	0.0	0.3	0.6	0.1	0.3	-	0.0	0.4	0.5	0.1	0.1	0.1	0.2	0.0	0.0	0.1	27.5

*Others include: Goldfish, Sauger, Lake Sturgeon, Rainbow Trout, Silver Lamprey, Lake Whitefish, Alewife, and Flathead Catfish.

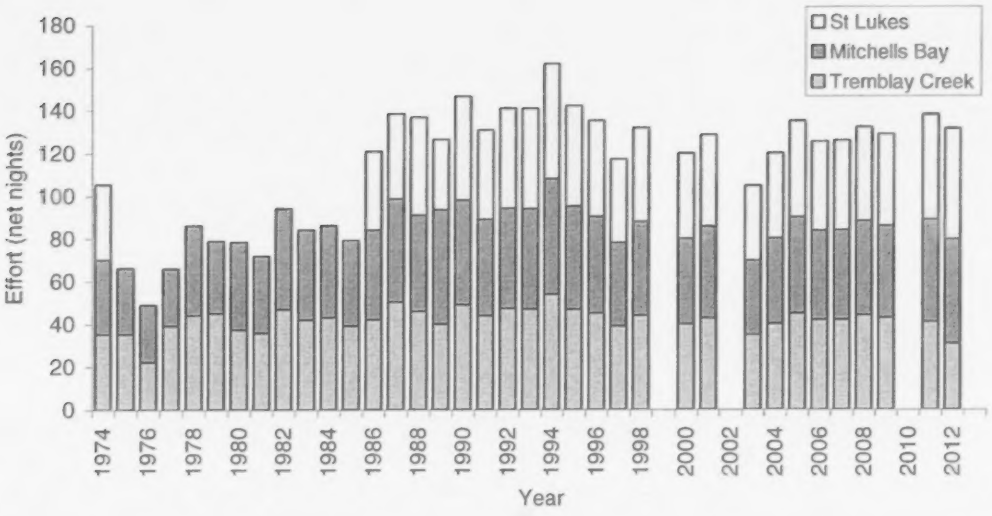

Figure 6.2.2 Total effort for the Lake St. Clair Fall Trap Net Index by site, 1974 to 2012 (St. Luke's was not fished from 1975 to 1985).

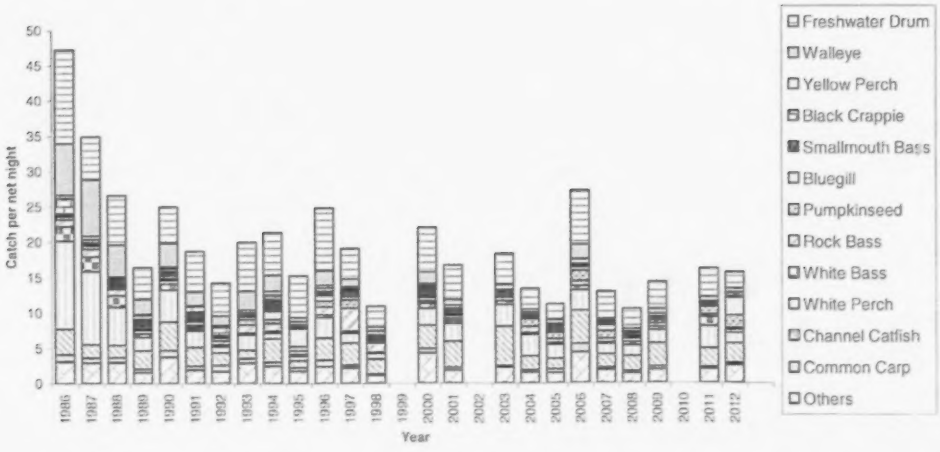

Figure 6.2.3 Catch per net night by species for all sites combined (Mitchell's Bay, St. Luke's, Tremblay Creek), 1986 to 2012.

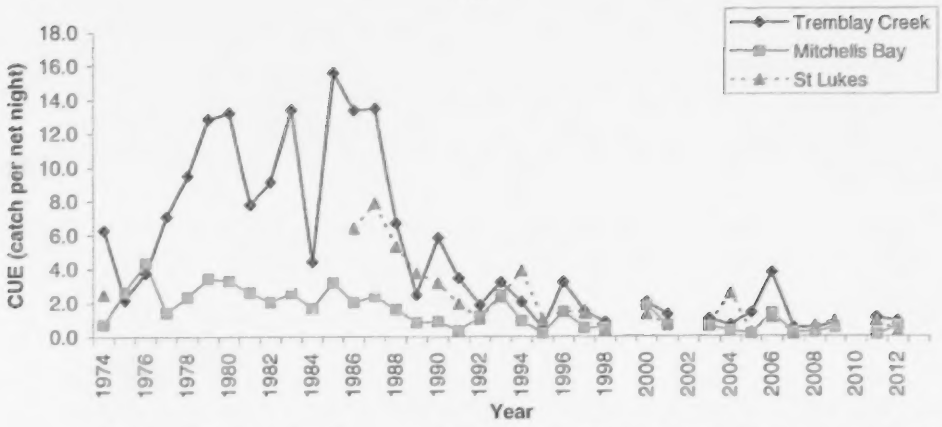

Figure 6.2.4 Catch per net night of Walleye at Tremblay Creek, Mitchell's Bay and St. Luke's sites, 1974 to 2012.

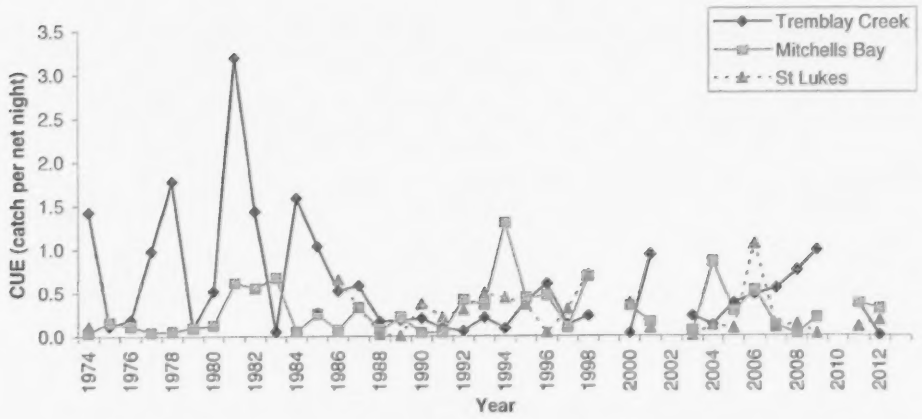

Figure 6.2.5 Catch per net night of Yellow Perch at Tremblay Creek, Mitchell's Bay and St. Luke's sites, 1974 to 2012.

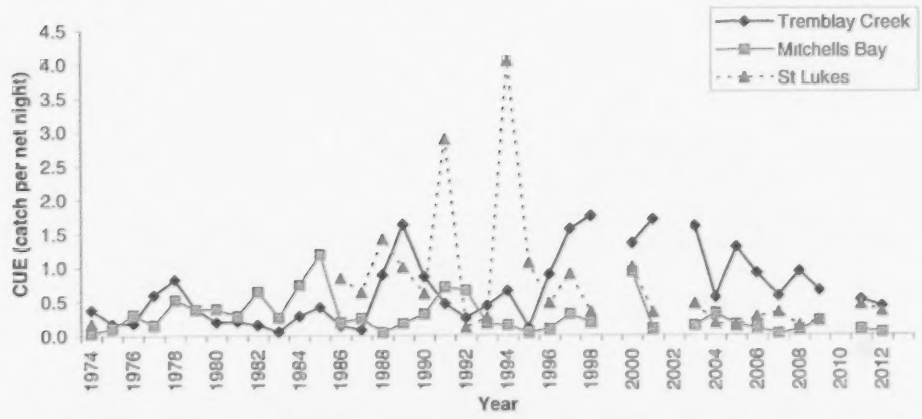

Figure 6.2.6 Catch per net night of Smallmouth Bass at Tremblay Creek, Mitchell's Bay and St. Luke's sites, 1974 to 2012.

6.3 Lake St. Clair Nearshore Index Fishing Program

Lake St. Clair is among the most biologically diverse ecosystems in North America. The lake is host to an abundant and diverse population of warm water fish species, and it provides critical spawning and nursery areas for many species. These species include several economically important species and some species at risk.

Surveys of young-of-the-year fish in Lake St. Clair have been carried out by the Ontario Ministry of Natural Resources, intermittently since 1979. Recently the survey has been completed each year from 2007 to 2012. The primary objective of the Lake St. Clair Nearshore Index Fishing Program is to assess the nearshore fish community along the southern shoreline of the lake. The survey is also used to assess the abundance of current year classes for target sport and commercial fish species. In addition the program has the ability to track and identify invasive species and species at risk.

For this study, young-of-year fish from eight fixed sites (Figure 1) along the Canadian shores of Lake St. Clair are captured over a nine week time period, from June 1 to July 31, 2012. The survey is carried out using a small mesh beach seine that is dragged twice for 30 meters at each site. Catches are standardized across species and sampling years using the catch-per-unit effort (CUE) statistic (defined as: number of fish caught/seine haul). Species richness and the Shannon-Wiener index are used as measures of biodiversity.

A total of 125 seine hauls were performed over the 2012 sampling period. The nearshore habitats of Lake St. Clair vary between sample sites and include a range of habitats from open sandy areas to areas with dense vegetation. For the 2012 sample year, mean site depth fished across the lake was 0.50 m, ranging from 0.3 to 0.7 m. Mean secchi disk transparency depths were the same as total depths. Ambient air temperature averaged throughout the 2012 survey period was 27°C, and ranged from 25.6°C to 27.7°C. Average water temperature of Lake St. Clair during the 2012 study period was 25.4°C, and ranged from 24.0°C to 27.6°C.

The survey yielded a total of 22,688 fish, representing 42 different species, from 13 families (Table 1). Of the total catch lakewide, 85% (19,246 fish) were young-of-year fishes. Larval Cyprinids, Brook Silversides and Spottail Shiners were the predominant species caught throughout the sampling period. Species richness varied from 11 to 33 per site, but the lakewide total was 42. Shannon-Wiener diversity scores ranged from 1.00 to 2.26 per site, with a lakewide average of 2.12. Average lakewide CUE was 182 fish/seine haul. Six types of invasive species were captured throughout the sample period; Goldfish, Common Carp, Threespine Stickleback, White Perch, and Round and Tubenose Goby, all of which have been previously reported in the waters of Lake St. Clair.

Catch of sport fish was generally low, with only 7 YOY Yellow Perch, and 0 YOY Walleye caught. The 2012 sampling season did, however, produce 6 YOY Muskellunge, a species that has been caught sporadically and in small numbers throughout the history of this survey. YOY Smallmouth and Largemouth Bass were relatively weak where combined they accounted for 4% of the total YOY catch. One species at risk, the endangered Pugnose Shiner (*Notropis anogenus*), was captured at the Mitchell's Bay inshore and St. Luke's sites.

Historically, this program has not captured high numbers of YOY Walleye, Yellow Perch or Muskellunge even in years of known strong year classes. Due to temporal patchiness of the dataset, clear relationships between littoral zone sportfish YOY abundance and recruitment indices have not been determined. Future work will address this information gap and provide a predictive tool for assessing year class strength of sportfish on Lake St. Clair. Overall, the irregular nature of historical sampling in the Lake St. Clair Young-of-Year Survey has prevented reporting the dynamics of the nearshore fish community. Continued annual sampling will enable us to quantify observed changes in this important ecosystem and will be a valuable tool for assessing both recruitment of economically important species and the state of the forage fish base.

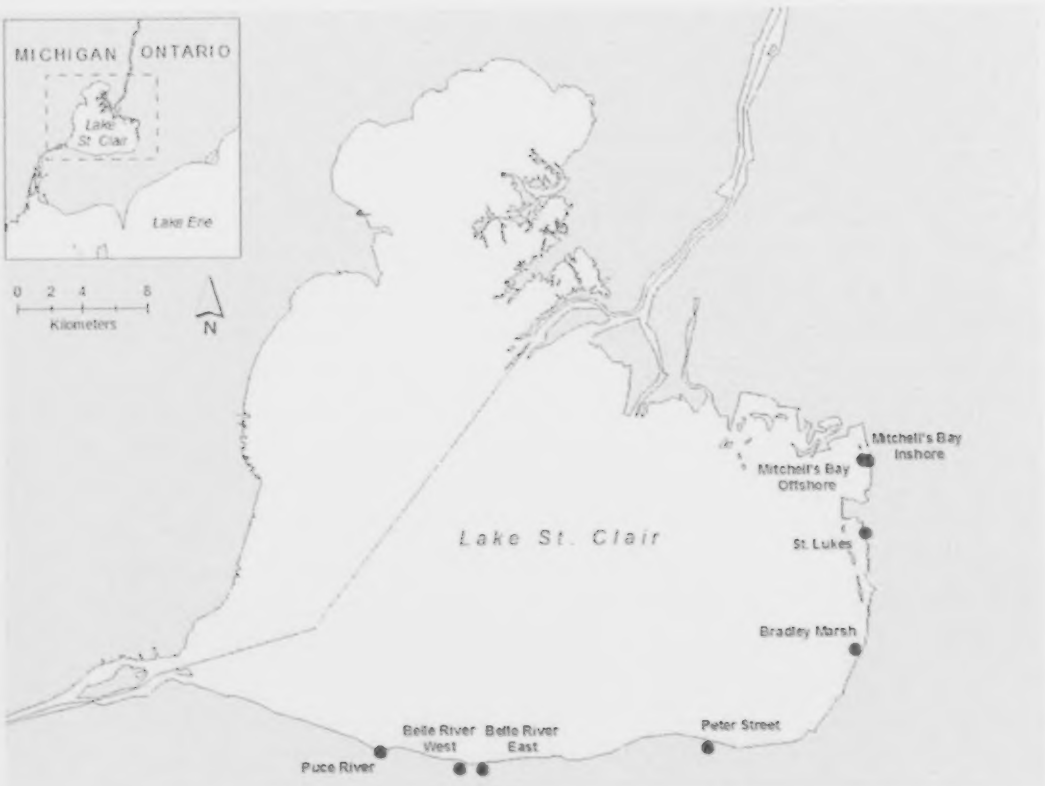

Figure 6.3.1 Location of eight fixed sites on Lake St. Clair of the Lake St. Clair Nearshore Index Fishing Program.

Table 6.3.1 Catch summary for all species caught in Lake St. Clair, 2012.

Common Name	Scientific Name	Trophic Guild	Total YOY	Total Adult	Total Catch	Total C.U.E. (#fish/seine haul)	Relative Abundance (%)
Minnow spp	*Cyrprinid spp*	Planktivore	6,067	10	6,077	48.62	26.8
Spottail Shiner	*Notropis hudsonius*	Planktivore	4,288	1,135	5,423	43.38	23.9
Brook Silverside	*Labidesthes sicculus*	Planktivore	4,682	67	4,749	37.99	20.9
White Perch	*Morone americana*	Benthivore	788	261	1,049	8.39	4.6
Bluntnose Shiner	*Pimephales notatus*	Planktivore	663	105	768	6.14	3.4
Sand Shiner	*Notropis stramineus*	Planktivore	20	655	675	5.40	3.0
Largemouth Bass	*Micropterus salmoides*	Piscivore	659	5	664	5.31	2.9
Gizzard Shad	*Dorosoma cepedianum*	Planktivore	557	12	569	4.55	2.5
Channel Catfish	*Ictalurus punctatus*	Benthivore	440	13	453	3.62	2.0
Emerald Shiner	*Notropis atherinoides*	Planktivore	43	407	450	3.60	2.0
Mimic Shiner	*Notropis volucellus*	Planktivore	2	447	449	3.59	2.0
Sunfish spp	*Centrarchid spp*	-	427		427	3.42	1.9
Round Goby	*Neogobius melanostomus*	Benthivore	226	20	246	1.97	1.1
Spotfin Shiner	*Cyprinella spiloptera*	Planktivore	31	146	177	1.42	0.8
Smallmouth Bass	*Micropterus dolomieu*	Piscivore	128	5	133	1.06	0.6
Banded Killifish	*Fundulus diaphanus*	Benthivore	54	38	92	0.74	0.4
Quillback	*Carpiodes cyprinus*	Benthivore	51	1	52	0.42	0.2
Yellow Perch	*Perca flavescens*	Piscivore	7	27	34	0.27	0.1
Goldfish	*Carassius auratus*	Benthivore	32		32	0.26	0.1
Bluegill	*Lepomis macrochirus*	Benthivore	18	11	29	0.23	0.1
Common Carp	*Cyprinus carpio*	Benthivore	26		26	0.21	0.1
Logperch	*Percina caprodes*	Benthivore	1	20	21	0.17	0.1
Pumpkinseed	*Lepomis gibbosus*	Benthivore		18	18	0.14	0.1
Ghost Shiner	*Notropis buchanani*	Planktivore		15	15	0.12	0.1
Rock Bass	*Ambloplites rupestris*	Benthivore	8	5	13	0.10	0.1
Muskellunge	*Esox masquinongy*	Piscivore	6		6	0.05	<0.01
White Sucker	*Catostomus commersonii*	Benthivore	3	3	6	0.05	<0.01
Creek Chub	*Semotilus atromaculatus*	Planktivore		5	5	0.04	<0.01
Shorthead Redhorse	*Moxostoma macrolepidotum*	Benthivore		4	4	0.03	<0.01
Tubnose Goby	*Proterorhinus marmoratus*	Benthivore	4		4	0.03	<0.01
Sucker spp	*Catostomid spp*	Benthivore	3		3	0.02	<0.01
Pugnose Shiner	*Notropis anogenus*	Planktivore	1	2	3	0.02	<0.01
White Crappie	*Pomoxis annularis*	Benthivore	3		3	0.02	<0.01
Trout-perch	*Percopsis omiscomaycus*	Benthivore	1	1	2	0.02	<0.01
White Bass	*Morone chrysops*	Piscivore	1	1	2	0.02	<0.01
Unidentified		-	2		2	0.02	<0.01
Silver Redhorse	*Moxostoma anisurum*	Benthivore		1	1	0.01	<0.01
Redhorse spp	*Moxostoma spp*	Benthivore	1		1	0.01	<0.01
Hornyhead Chub	*Nocomis biguttatus*	Planktivore		1	1	0.01	<0.01
Blackchin Shiner	*Notropis heterodon*	Planktivore	1		1	0.01	<0.01
Yellow Bullhead	*Ameiurus natalis*	Benthivore	1		1	0.01	<0.01
Threespine Stickleback	*Gasterosteus aculeatus*	Benthivore	1		1	0.01	<0.01
Black Crappie	*Pomoxis nigromaculatus*	Benthivore		1	1	0.01	<0.01
Total			**19,246**	**3,442**	**22,688**	**181.50**	**100.0**

APPENDIX A

LAKE ERIE MANAGEMENT UNIT STAFF
2012

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Rob Dietz – Fisheries Technician
Aida Baptista – Data Entry Operator
Debbie Seili – Clerk Typist/Receptionist
David Beneteau– Enforcement Supervisor
Randy Tippin – A/Enforcement Supervisor
Sean Insley – Conservation Officer
Kevin Sprague – Conservation Officer
Colin Stass – Conservation Officer
Bill Ingham – Intelligence & Investigation Officer

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David Scratch – Fisheries Technician
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Acronyms Reference:

A/ - Acting
C.O.A. – Canada Ontario Agreement
SEP – Summer Experience Program

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